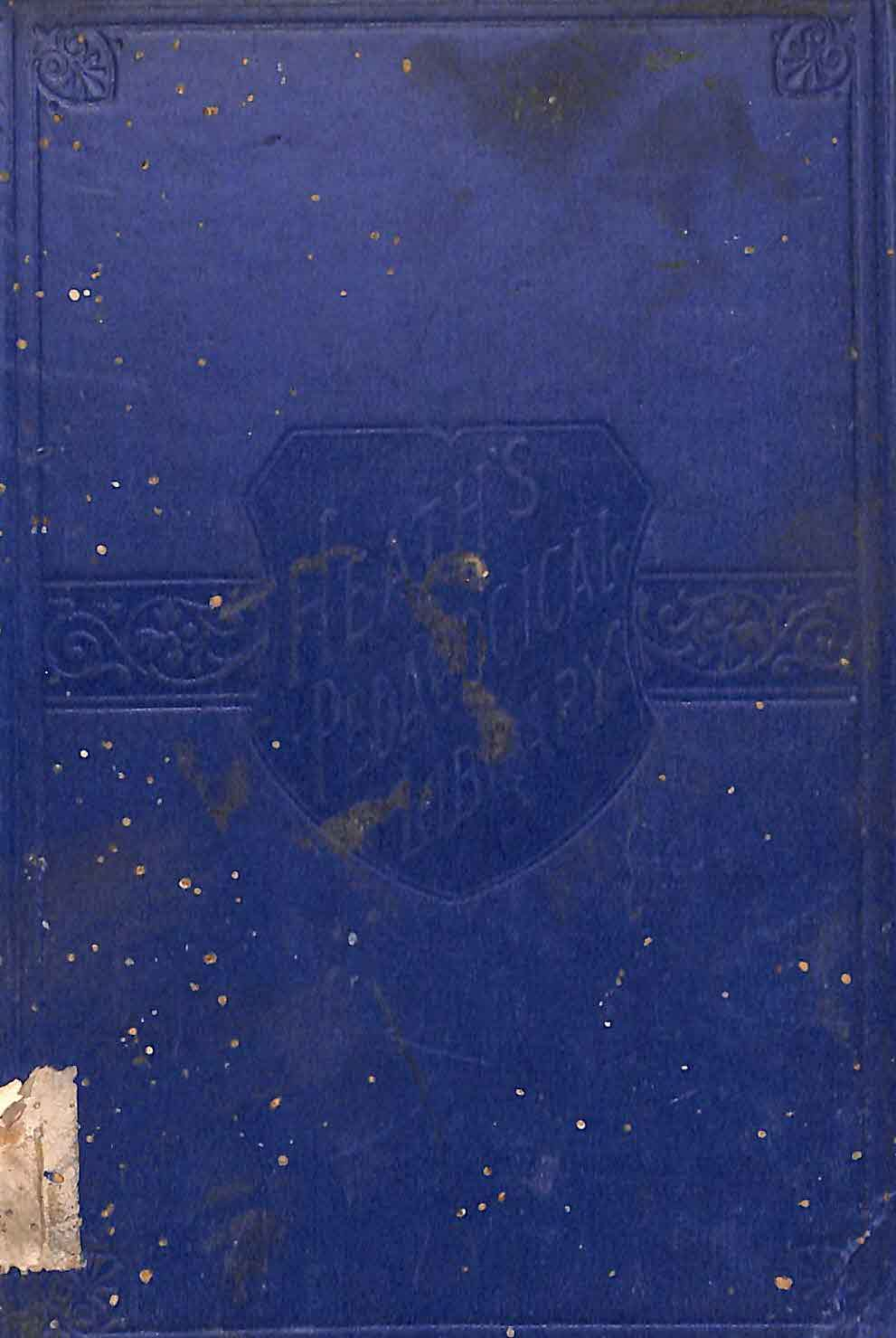

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THE ESSENTIALS OF METHOD

A DISCUSSION OF THE ESSENTIAL FORM OF RIGHT METHODS IN TEACHING

Observation Generalization Application

REVISED EDITION

BY

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PRESIDENT OF SWARTHMORE COLLEGE

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PREFACE.

ANALOGIES play an important *rôle* in all explanations of mental phenomena. This is true because nearly all our terms for mental processes and products are borrowed from sense. Among the many analogical theories of mind, and hence of education, two are particularly prominent: (1) That which regards the soul as a *germ*, containing by *involution* that which it is to become by *evolution*, — a self-active power which seizes upon its surroundings, appropriating what is useful for the development of its predetermined form and content; and (2) that theory which regards the mind at any given stage of its development as the resultant of the manifold forces of its environment, as a product more *externally* than *internally* produced.

The first of these views may be called the *germ* theory of education; the second, the *architectural* theory. According to the first notion, the mind is a self-producer of a predetermined product. According to the second, it is the result produced by the educational architect. The first conception makes the teacher merely a gardener; the second makes him an architect of mind. The first demands no science of education from the subject-matter side; the second compels a study of mind in its more mechanical aspects, and a pedagogical adjustment of the matter of education to the laws of mind-structure. It finds the science of instruction to consist in giving rise to concepts, in co-ordinating and properly relating them. According to this idea, the science of education is the science of the concept, — knowledge, thought-power, intensity and direction of will, follow from an application of the architectonics of concepts.

At first view, these two theories are mutually exclusive; but a more careful examination shows them to be mutually complementary. The germ theory finds its truth in the idea of the *self-activity* of the mind to be educated, and in the fact that the *form* of all mental activity in knowing, feeling, and willing is predetermined, just as the form of the oak is involved in the acorn. But this analogy breaks down when the content of mind is considered. *How* knowledge shall be acquired, held and expressed is as much predetermined in the infant's mind, as the ultimate form of the plant is involved in the seed from which it springs, — the acorn never produces the maple; but *what* this knowledge shall be is not predetermined. A child left at birth upon an uninhabited island, and nourished by beasts, would become a beast, at least so far as the content of knowledge is concerned. The practical content of man's knowledge and judgment, and hence of his will and character, depends upon influences and positive forces exterior to himself. Here the architectural theory of education finds its truth; for, *what* a man knows, the whole *content* of his knowing, judging, and willing, depends upon the kind, amount, and arrangement of the subject-matter of education. In this view, the office of the teacher is magnified: the pedagogy of the subjects of instruction becomes of the greatest importance.

Again, these two theories of education are but two figurative expressions for the manifest truth, *that there is a method in the child and a method in the subject of study.* A complete pedagogy of instruction brings these two elements into harmony, makes them complementary the one to the other. The method in the subject at any stage exactly fits a corresponding stage of development in the method in the child. In other words, the development in the subject must be made at all stages to fit the development of the child. For this reason, the germ and architectural theories of education do not exclude but complement each other, and neither of them can be spared from a perfected science of education.

The present work deals with one phase of this adjustment of subject-matter to mind. It seeks to find the essential forms of methods of instruction, as determined by the general law of development in the mind of the child. It has therefore nothing to do with the *content* of knowledge;

but concerns itself solely with an inquiry as to *how we learn, and consequently how we must teach.*

Three-sidedness is a universal property of triangles, so is triangularity; just so, there are certain necessary and universal characteristics of all rational methods of teaching. To discover, through an analysis of the mental activities involved in knowing, what these essential elements of a good method are, is the function of this volume.

CONTENTS.

PART I.

PSYCHOLOGICAL BASIS.

CHAPTER I.

THE INDIVIDUAL NOTION.

§ 1. FORMATION AND SIGNIFICANCE OF THE INDIVIDUAL NOTION 13
§ 2. EXTENSION OF THIS TERM TO APPLY TO THE PRODUCT OF INTERNAL PERCEPTION 15

THE GENERAL NOTION.

§ 3. LANGUAGE REVEALS THE NATURE OF THOUGHT. — A STUDY OF THE NOUN. — THE COMMON NOUN EXPRESSES THE GENERAL NOTION. — EXTENT OF THE NOUN (NOTION) 18
§ 4. CONTENT OF THE NOUN (NOTION). — RELATION OF CONTENT AND EXTENT. — PSYCHOLOGICAL *vs.* LOGICAL VIEW. — HOW CHILDREN FORM GENERAL NOTIONS 19
§ 5. A GENERAL NOTION CANNOT BE IMAGED. — A SCHEME FOR THE FORMATION OF INDIVIDUAL IMAGES. — EXPRESSED IN A DEFINITION 21
§ 6. EXTENSION OF TERM GENERAL NOTION TO APPLY TO ANY GENERAL TRUTH, WHETHER EXPRESSED IN A DEFINITION, A LAW, A RULE, A PRINCIPLE, OR A MORAL MAXIM 22

CHAPTER II.

APPERCEPTION; OR, THE ASSIMILATION OF KNOWLEDGE.

§ 7. A Popular View of Apperception 24
§ 8. Apperception implied in Common Mental Processes 28
§ 9. Scientific View of Apperception 33
§ 10. Relation of Apperception to the Association of Ideas 37
§ 11. Psychological Nature of Apperception explained from the Standpoint of the Judgment 41

PART II.

NECESSARY STAGES OF RATIONAL METHODS.

CHAPTER III.

APPERCEPTION OF INDIVIDUAL NOTIONS.

§ 12. Motives for the Study of the Conditions of Apperception 45
§ 13. Native Spontaneity of Mind inadequate. — A Function of the Teacher to prepare the Mind for Rapid and Efficient Assimilation of New Knowledge 45
§ 14. Two Kinds of Activity on the Part of the Teacher: (1) Preparation, (2) Presentation . 46

PREPARATION.

§ 15. Definition of Preparation 46
§ 16. Relation of Preparation to the Analytical Judgment 46
§ 17. Kind and Place of Preparation. — Main Points to be observed in Preparation 47

PRESENTATION.

§ 18. Relation of Presentation to the Synthetical Judgment 51
§ 19. Points involved in Presentation, but not here developed, such as the Arrangement of the Curriculum according to the Historical Stages of Culture, and to Concentration . 52

LAW OF SUCCESSIVE CLEARNESS.

§ 20. Explanation of this Law 53
§ 21. Clear Apprehension of Individual Facts of the Lesson, and then their Synthesis. — "Step by Step" 55
§ 22. Illustrations 56

THE SERIES.

§ 23. How the Series arises from Time Conditions. — Illustration of a Mechanical Series. — Remembering the Series 57
§ 24. Breaking *vs.* Extending the Series 58
§ 25. Time and Attention the Conditions for fixing the Series in Memory 60

CHAPTER IV.

TRANSITION FROM INDIVIDUAL TO GENERAL NOTIONS.

GENERAL VIEW.

§ 26. Necessity of Generalization. — Illustrations. — Lessing quoted 61
§ 27. Simultaneity of Notions in Consciousness necessary to the Formation of the General Notion. 64
§ 28. Pure Time Associations *vs.* Logical Association . 64
§ 29. Comparison of Individual Notions. — Thought, not Imagination, the Subject of Investigation, 65
§ 30. Process involved in Comparison of Notions present to Consciousness. — How do New Classes arise, or what is the Nature of Induction? . 65

§ 31. Dr. W. T. Harris's Explanation. — New Light on Apperception 66
§ 32. Nouns express General Notions. — The Maxim, "First the Idea, then the Word," examined . 71
§ 33. Progress from Individual to General Notions necessary at all Stages of School Life. — A Great Problem in Pedagogics. — Pestalozzi's View. — Educational Movements vibrate between Underived Generals and Ungeneralized Particulars. — The Golden Mean . . 73

SPECIFIC CONSIDERATIONS.

§ 34. A Distinction needful between Mathematical and Non-Mathematical Generalizations . . 75
§ 35. A priori Nature of Mathematical Truths. — Illustrations enable the Mind to grasp them . 75
§ 36. General Notions pertaining to External Nature. — Illustrations 77
§ 37. How to generalize in Political, Social, or Ethical Matters 78
§ 38. Æsthetic and Religious Generalizations . . 79

CHAPTER V.

THE RETURN FROM GENERAL TO INDIVIDUAL NOTIONS.

§ 39. This the Third Grand Stage of Methods. — Lange and Pestalozzi quoted 81
§ 40. Kant's Dictum. — Knowledge must have a Full, Rich Content. — This is gained by the Persistent Application of Generals 82
§ 41. Application secures Permanency to Generalizations 83
§ 42. Bearing of Application of Generals to Practical Affairs of Life 83
§ 43. Co-ordination of Knowledge secured by a Constant Return from General to Individual Notions 84

§ 44. Critique of Customary Methods of teaching the Various School Studies, in the Light of Foregoing Exposition of the Essential Form of Right Methods 85

CHAPTER VI.

ADDITIONAL CONSIDERATIONS.

METHOD-WHOLES.

§ 45. Proper Subdivision of Subject-matter. — Principles in Accordance with which this must be done 88

RELATION OF SO-CALLED "METHODS" TO THE ESSENTIAL FORMS.

§ 46. Methods of Instruction may be regarded from Three Standpoints: (1) the Learner, (2) the Matter taught, and (3) the Teacher. — Forms of Thought, — the Notion, the Judgment, the Syllogism, — hence Three Kinds of Methods: Explication, Predication, Demonstration. — Methods with Regard to Matter taught: Analytical, Synthetical; with Regard to Teacher: the Monologue, the Dialogue 91

PART III.

PRACTICAL ILLUSTRATIONS.

CHAPTER VII.

§ 47. Introductory Summary 94

LANGUAGE.

§ 48. Oral Language-lesson for First Grade: the Wren and the Bear 94
§ 49. Oral Language-lesson for Second or Third Grade: the Shipwreck (adapted from "Robinson Crusoe") 99

§ 50. Oral Language-lesson for Third or Fourth Grade: Paris and Helen (adapted from the Iliad) 103
§ 51. A Lesson in Grammar: What are the Essential Elements of a Sentence? 107
§ 52. A Lesson in Advanced Grammar: Nature and Use of the Adjective 109

ARITHMETIC.

§ 53. Number-lesson for the First Grade: The Number Three, Addition and Subtraction . . 114
§ 54. Fourth-grade Arithmetic-lesson: To multiply a Fraction by an Integer 118

READING.

§ 55. Treatment of a Reading-lesson in Lower and Middle Classes 120
§ 56. General Plan for Memorizing in the Lower Classes 121
§ 57. A Model Exercise. — Excelsior 122

GEOGRAPHY.

§ 58. Geography founded on Actual Observation by the Children 126

HISTORY.

§ 59. Course of an Oral History-lesson in Middle and Lower Classes 132

Ed
113

THE ESSENTIALS OF METHOD.

PART I.

PSYCHOLOGICAL BASIS.

CHAPTER I.

THE INDIVIDUAL NOTION.

§ 1. ALL mental activity is based upon the results of sense-perception, with which it starts. It is inconceivable that a living being having no use of the senses could have any mental life. It is true, indeed, that mental life presupposes *more* than a mere use of the senses, but it presupposes this also. This element can be omitted from the notion of intellectual activity no more than a necessary element of any other notion can be omitted without destroying the notion. Thus, who could think a triangle with one side left out, or a straight line with a curve in it, or a pair of scissors with one blade missing, or a train of cars with no rear car? Since, then, all mental activity presupposes and starts with knowledge gained through the senses, it is obvious that we should understand the nature of this knowledge, in order to gain any rational insight into the principles of right methods.

The senses furnish us that which we call the individual *notion.* Looking about my study table, I perceive, through the sense of sight, an inkstand, a pen, a book, a letter. Each of these is, like every other single thing, an *individual object.* The image, or idea, which my sense of sight gives me of each of these individual objects is appropriately called an *individual notion.* (Many other names besides *notion* are in common use for the same thing. Thus, one often hears the terms, *perception, percept, idea, mental picture or image, individual concept, etc.*) In the same manner, by passing through a room in the dark, one may get individual notions of a rocking-chair, a table, a hanging lamp, through the sense of touch alone. Through the sense of hearing, we get individual notions of a piece of music, the song of a bird, the whistle of a boy, the ringing of a bell. Each of the senses may, alone, give an individual notion of some one thing. Generally, however, they work together, each supporting and re-enforcing the others, and helping to give a more complete notion of the thing under consideration. A boy, for instance, gets a notion of the object *apple* by seeing it; yet he gets a more complete and satisfactory notion of it by touching it, smelling it, tasting it. But the whole complex of his sensations of the apple goes to make up what we have called his *individual notion* of it.

A moment's reflection shows that this individual notion, though it is of a single thing, is in itself very complex. Think of the boy's apple: there are the form and color, which appeal to the eye; the qualities of solidity and smoothness, which appeal to the touch; the fragrant qualities, which appeal to the smell; and those other properties which appeal to the taste. Just so, every individual notion is a complex, or synthesis, of many elements. But all knowledge, and hence all education, begins with these complex individual notions. One should therefore think twice before trying to apply such educational maxims as, *Proceed from the simple to the complex.* From the foregoing, it is easy to see that this maxim is not universal in its application.

§ **2.** *But, for the science of methods, we must extend our idea of the individual notion beyond mere perceptions of objects gained through the senses.*

As ordinarily understood, an individual notion is the complex of all the sensations which we have of a thing. It is, therefore, not an immediately given individual concept, but it presupposes sensations, reproductions, time and space forms, also the notion of our own body, and its distinction from the rest of the external world. Sensations, however, are nothing to mind until *perceived.* Perception is then the first form of knowledge. It is nothing more than the synthesis of the nerve excitations with the soul states produced by them. The perception (Anschauung) is the psychical image of the single thing, the individual existence. The internally or externally observed bird, "robin," is a definite individual; determinate as to color, size, form, voice, and all that observation furnishes regarding him. The notion of a species or genus (general notion) cannot be observed. (Compare Drbal, "Empirische Psychologie," p. 161.) This notion of the perception of individual objects in space through the senses has been extended very generally by German authors, to an inner perception (innere Anschauung) of individual notions not given by the senses. For instance, in grammar, the relation of one word to another may be *perceived* even though the outward form gives no hint of the relation; as, a noun in the nominative or objective case. As can readily be seen, this extension is very convenient for pedagogy, since it helps to emphasize the fact that we reach general laws only through individual facts.

Pfisterer ("Pädagogische Psychologie," p. 229) remarks: "We distinguish commonly, and not without reason, a double observation (Anschauung), an outer and an inner. The outer observation is that mediated through the senses; the inner is quite as much an observation by means of the inner senses as it is an observation of what goes on within. An observation by means of the inner senses is necessary, because not only all processes of the inner world, but also many phenomena and activities of the outer world, especially all that pertain to historical and social life, cannot at all or but partially and with great effort be brought under the observation of the senses. What remains but to bring them under *inner*, *spiritual* observation, or to lead them before the inner senses (powers of presentation and imagination) by vivid description or narration? By means of these, the child's mind can and should get a more or less clear image of a thing or activity, and mentally 'see' and enjoy it, without ever having perceived it in this form by the senses."

If I take two pieces of paper of the same shape and size, fold each of them into eight equal parts, and tear off five parts from each paper, I shall find by counting that I have six parts left. By means of this concrete illustration, I have received an *individual notion* of the fact, that $\frac{3}{8} \times 2 = \frac{6}{8}$. In this case, my notion is not of an object, but of certain numerical relations; yet it is a notion of an individual case of these relations, and is, hence, just as truly a concrete or individual notion as that gained from seeing, touching, smelling, and tasting the apple.

If I take a vessel with a spout, fill it full of water, place a floating body upon the surface of the water, and then compare the weight of the displaced water with the weight of the floating body, I shall get an *individual* *notion*, or what is the same thing, a concrete illustration of the fact that a floating body displaces its own weight of water.

What is true of the physical world and its relations is equally true of the spiritual world and its relations. In the pages of history we get concrete or individual notions, of bravery, of vigilance, of celerity, of the nobility of patriotism, of the vanity and wickedness of ambition, of the contemptibleness of cowardice, indecision, or treason. A moral truth, though it cannot be presented to the senses, may be individualized, or made concrete, by concrete illustration; as, through the story of George Washington and his hatchet. Every fable is the concrete illustration of some moral or intellectual truth, and thus gives an *individual notion* of this truth. In the same way moral lessons are individualized throughout our history and in most of our imaginative stories.

The main point in this whole matter is that our knowledge starts with the individual notion, whether it is of the things of sense, of their relations, or of the concrete embodiment of any purely intellectual or moral truth. In any case, and in all cases, real knowledge must start with and be based upon the concrete, individual notion.[1]

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[1] Pestalozzi. — Instruction must not only be based upon *sense perception*, but also upon *inner* or *intellectual* perception.

It is also very important for us to emphasize for instruction that power of *silent receptivity*, which allows the matter of instruction to penetrate the depths of the soul, to grow and ripen, even without the illumination of reflection.

Herbart (vol. i. p. 120, edition by O. Willman). — The marrow of education is itself destroyed, if the first fresh presentations become old without being *perceived*; if lifeless repetitions are tediously extended, where interest should eagerly seize; if the forms of speech, in which wealth of conviction even best loves to express itself, are bereft of their spirit, and laid away as corpses in the caverns of memory.

THE GENERAL NOTION.

§ **3**. Language reflects thought as the mirror reflects the image of him who stands before it. For this reason, a study of language is often the most direct road to an understanding of the various elements of thought. We will, therefore, approach the next stage of our topic by calling to mind some of the implications of language. We say that a noun is the name of an object, but this object must primarily be an object of thought, for names do not inhere in things; they are only means by which one mind is able to "convey" its own ideas to another mind. But actual things of sense correspond to ideas gained through a normal use of the senses, hence, secondarily and mediately the noun is the name of the object itself, and no confusion need arise from thinking of the noun as a symbol of an actual physical thing in space or of an idea of the mind.[1] A noun may be considered in two ways:—

(1) As to the quantity or number of that to which it applies, called the *extent* of the noun (or *notion*, which the noun represents); and

(2) As to the qualities or attributes which belong to that to which the noun applies, called the *content* of the noun (or *notion*, which the noun represents).

The *extent* may evidently include *one*, or *some*, or *all*. In the sentence, *Socrates identifies virtue with wisdom*, only one person is meant by the word, *Socrates*; hence this word represents an individual notion. But in the sentence, *Man is mortal*, it is clear that the extent of the noun is not individual but general,—that *all* men are included by the word *man*. The same thing is true of the words *virtue* and *wisdom* in the preceding sentence, for these are *general* terms. They do not refer to particular virtues or wisdoms. With regard to extent, they differ from *man* and similar words in not being *numerically* considered. General names, like *man, virtue, wisdom*, are called common nouns. They can apply to individual objects, or to limited numbers or quantities, only through limitation by adjectives. Thus, *this* man, *tall* oaks, *much* wisdom.

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[1] Compare Everett, *The Science of Thought*, p. 67.

Common nouns, therefore, being general names, always express general notions.

When unlimited by adjectives, the common noun (hence the general notion which it represents) always embraces the whole extent of that to which the noun refers.

§ 4. But, as we have seen, the noun (hence the notion) has also *content*, which will vary as the extent is expanded or contracted.

One might think of a rose as the synthesis of its various attributes of form, color, odor, etc. In any individual rose these attributes would be numerous and perfectly definite. The color, for instance, would be *white* or *red;* but in the general notion *rose*, particular attributes can no longer be assigned, for only those attributes could belong to *rose in general* which are common to all roses. Nouns may then be limited by reference to their content. Adjectives which modify in this way are called *qualifying* adjectives, because they apply to the attributes or qualities belonging to that which the noun represents; for instance, *Black* sheep are rare. Here the general class *sheep* is restricted or limited in extent by the qualifying adjective *black*. In the sentence, The *woolly* sheep is a timid animal, the word *woolly* does not limit the *extent* of the notion, for this attribute is common to all sheep, unless, perchance, the professor of the university of Lagado was successful, who spent many years in trying to raise sheep without wool.

From what has been said, it may be seen that when the extent of a notion is smallest (one), its content is greatest; and that when its extent is greatest (all of its class or kind), the content is least; in general, the greater the extent, the smaller the content, and *vice versa*. Thus, the term *animal* embraces a far greater number of individuals than the term *quadruped*, but at the same time there are fewer characteristics which are common to all animals than are common to all quadrupeds. The term *cat* is less than *quadruped* in *extent*, but it is richer in *content*. The same can be seen in the general terms *tree, forest-tree, oak, white-oak*. Here the *extent* constantly narrows, but the *content*, i.e., the number of common characteristics, constantly increases.

But, though when logically considered, extent and content of notions are related as indicated, it does not follow that knowledge of content grows meager as knowledge of extent enlarges. Were this true, we should have to say that the more the zoölogist extends his classes, the less he would know about them.

All effective learning is occupied quite as much with enriching content as with widening extent. It is evident, therefore, that knowledge should never be divorced from the individual thing, however broad its generalization may become.

Not only is the idea of the general notion familiar in grammar, but it manifests itself in a rudimentary stage in early childhood. How a child forms such an idea may be seen from an illustration. Suppose he has observed a number of dogs of various breeds, but has seen no one of them more than once. If there were, say, ten of them in all, the external *common* characteristics of all have been observable ten times, whereas the individual characteristics of each dog have appeared but *once*. Thus, the fact that all dogs have ears has been manifested ten times, though the characteristic of cropped ears, or of silky ears, may have occurred but once. So of the muzzle, the tail, the legs, etc.

Savages, as Herbert Spencer shows, form general notions, but naturally of a much more elementary character than is the case with civilized races. Indeed, the history of the language seems to show that vague general terms preceded specific individual ones. As soon as the child can say *cat*, *dog*, *horse*, intelligently, he has passed beyond the individual object; his knowledge has attained to a certain degree of universality. As we shall see hereafter, he can truly know an individual object only when he can subsume it under a general notion.

§ 5. A general notion is unlike the individual, also, in that it cannot be imaged or pictured to the mind. Every image in the mind must be individual, and in being individual it ceases to be general. I can imagine or picture any individual tree, even one which I have never seen, but it remains individual. It is *this* tree; viz., the one I am picturing to myself. It has definite form, color, size; its leaves are of a certain pattern, its bark has a peculiar formation. The general notion, or conception, *tree*, however, cannot possess these individual peculiarities, since it must include all trees. My general notion *tree* is rather a general rule or scheme for the formation of any individual image of a tree. If one thinks of such notions as are expressed by the abstract noun, — such as *redness, heat, goodness,* — it is plain that any individual notion of one of these qualities would imply a definite *degree,* but the general notion would include all degrees. For example, it would be impossible to find a point registered on a thermometer, which alone indicates *heat.* The same is true to a greater extent with the more abstract terms *force, matter, quality, being.* These must in truth always be thought; they cannot be perceived individually. (Compare Dr. W. T. Harris, "Illinois School Journal," July, 1888.) The general notion is therefore a general scheme, or rule, for the formation of individual notions, and is usually expressed in a definition. It is a product of thought, and has no external, objective existence apart from individual objects. It is vain to seek the universal horse, except so far as it is embodied in every horse. But the general notion has a truth and reality in these objects, for it finds a concrete embodiment of its characteristics in them.

The general notion, in its various stages of extent and content, is the necessary result of perception *and reflection.* It is that characteristic of mind that separates human intelligence from the intelligence of the brute, if we may judge from the fact that animals do not use language, and hence do not appear to have any symbols for generalization. A dog, for instance, has the individual notions, *cow, rabbit;* nor does he ever mistake the one for the other, though these notions, like the first conceptions of the child, are vague and indistinct. But his intelligence appears to stop at this stage. Not so with man. Man's intelligence sees the general in the particular; it discerns the common characteristics necessary to the notion of each individual, and by reflection forms a general conception. This fact, as we shall see, has great significance in education, and must never be forgotten.

§ **6.** Just as we found it expedient to enlarge our idea of the individual notion beyond the ordinary notions gained through the senses, so, likewise, shall we find it advantageous to extend our idea of general notions beyond those gained from the comparison of similar objects of sense.

Thus, in the multiplication of a fraction by an integer, we may pass by reflection or insight from the concrete individual notion of the numerical relations of objects to the *general truth* that a fraction is multiplied by multiplying its numerator, because the mind perceives the universality of a mathematical process whenever it clearly understands the conditions. From the individual example of the amount of displacement by a floating body, we may easily pass to the *general notion* that any floating body displaces its own weight of the liquid in which it floats. From the individual case of the merit of telling the truth, in the case of George Washington, we may pass by reflection to the *general fact* that truthfulness is right, and that lying is wrong. Noticing the characteristics of several individual circles, we soon find those which are common; viz., plane surface, curved boundary, and equidistance of all points on the circumference from a point within the circle. From these we construct our general notion of the circle, which in this case takes the form of a definition.

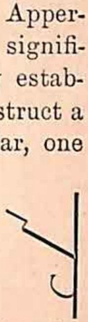
The general notion, therefore, thus extended and understood, embraces not only notions of material objects, their qualities and relations, but *definitions*, as in mathematics and natural science; *laws*, as the laws of gravitation, cohesion, repulsion, etc.; *principles*, as of economic or political life, or of warfare, etc.; *moral maxims*, as, e.g., the categorical imperative, — *So act that through your own will the rules of your conduct might become universal laws.*

CHAPTER II.

APPERCEPTION, OR THE ASSIMILATION OF KNOWLEDGE. A NEW STANDPOINT IN EDUCATIONAL PSYCHOLOGY.

GENERAL VIEW.

§ 7. ROUGHLY speaking, apperception is to the mind what the process of digestion and assimilation of food is to the body. Suitable food contains the elements needed for the nourishment of all parts of the body, such as bone, muscle, fat, nerves, teeth, nails, hair, etc., while the assimilative process brings each food element into right relations with the part of the physical organism for which it is appropriate. Indigestible matter is either indifferent or harmful to the system. Somewhat analogous to this physical process is the mental one we call apperception. The senses present to us what may be termed the raw material of knowledge. It is upon this material that the mind exerts its assimilative function. It naturally relates each new element of knowledge, as it is presented, to its appropriate place in the knowledge organism, thereby giving significance to the new experience. But there is this wide difference between the physical and the mental assimilation, — digestion is mechanical and unconscious, whereas apperception is conscious and necessarily incomplete. A good digestive system will utilize the nutriment in almost any kind of food, but the mind of the child has only the child's apprehension for the experience furnished by its environment. In a museum, for instance, an image which may mean to the child merely an ugly doll, may mean to the adult a system of idolatry, a stage of civilization for a people. The child relates the new object to the kindred facts of his own experience: he can do no more; whereas the man, with vastly wider knowledge and mental power, extends the relations to a whole system of facts. Apperception is, then, in general, the process of giving significance to facts by relating them to our more firmly established knowledge. To illustrate further, let us construct a figure of three lines, one straight and perpendicular, one broken and oblique, and one curved, thus: —



Sight gives us the figure as it stands, but the apprehension that we get at first view is unsatisfactory. We have perhaps had experience enough with lines to enable us to relate each one to its appropriate class, but we see no idea, no purpose in the whole. Remembering, now, however, that a painter once boasted that he could, by means of three lines, represent a soldier and his dog entering an inn, we can at once associate the hitherto meaningless marks with a system of ideas, and when this is done, the process of apperception may be said to be complete.

There are a number of psychological methods of viewing the various problems arising in education. Some of these have in the past served a useful purpose in enabling men to come to rational conclusions on educational questions; some are still comparatively new. Among the latter the most prominent are two branches of empirical psychology — that known as physiological psychology, and that in which the doctrine of apperception is an important factor. Physiological psychology studies mental acts by observing and measuring their mechanical occasion and results, according to the methods of physical science. It has undoubted value for all that class of problems in which bodily health and well-being are important factors. In what we may term apperceptional psychology, we attack the educational problems pertaining to the acquisition of knowledge and the formation of character in another way. We recognize the fact that each advance in knowledge is very largely determined in rate, kind, and amount by the results that our past experiences have left upon our minds. In other words, the present make-up of our minds in knowledge, habits of thought, interests, purposes, etc., determines to very large extent what interpretation we shall put upon a given element of knowledge when presented to us by a teacher, or by the ordinary experience of life. If, then, the past experience of the child in and out of school is so potent in determining his progress, it seems evident that his teacher should go to work consciously to do two things: first, in his teaching, to utilize in the best possible way the past experience of the child; and, second, to pave the way for future progress by the best possible presentation of the studies that are to make up the chief part of the pupil's knowledge.

The value to the teacher of this way of approaching the educational problems of instruction may, perhaps, be more clearly seen by contrasting it with other methods of studying psychology. We have, for instance, a method called rational psychology. In this method of study it makes no difference to us what the experience of the individual may have been. The mind of a Chinaman or an Esquimau will do just as well as that of a college professor or that of a farmer. Our constant inquiry is, What constitutes a mind? Evidently something, else a camera could have experiences as well as a man. In rational psychology we look for what must be found in every mind — its laws of action, its constituting principles. All that the teacher can do is to recognize these facts, and govern himself accordingly. He cannot change one of them. From the apperceptive point of view, however, we are chiefly concerned not with the unchangeable laws of mental action, but with the constantly changing content of mind, over which the teacher has some control, since he can utilize and create it.

There is another way of looking at mental life, in which the various modes of activity are classified under the name of faculties. We have accordingly the faculties of memory, perception, imagination, reason, will, and the like, each being regarded as an organ of the mind, and needing a special training. Thus, to train the memory is to exercise it by requiring the child to commit large amounts of useful knowledge. But since knowledge becomes manageable by condensation into rules, principles, and abstract statements, the danger is that the pupils will be called upon to memorize large amounts of unassimilated matter, thus bringing about a sort of paralysis of the thinking power, as we see in Chinese education. Similar danger attends all attempts to train other faculties in the same manner. Reason is not necessarily developed by the repetition of formulas, nor is will made stronger by the repetition of aphorisms. The difficulty with this method of looking at the mind is that everything is external. The teacher sets himself over against a being of supposed complicated organism, and attempts in a purely external manner to train the organs by devising a special exercise for each. When we recognize the process of apperception, however, then the external standpoint gives place to an internal one, the teacher regulating the amount and method of his instruction by the psychical needs of the child, which are determined largely by his knowledge and his interests.

Just as Copernicus brought simplicity and order into astronomy by discovering the true center of the solar system, so we shall bring simplicity and order into our instruction when we recognize the true center of the educational system — the apperceptive power of the child.

§ 8. We may still further understand the significance of the apperceptive process by seeing how it is implied, even in our most familiar mental acts.

(1) The value of sense-perception as a starting-point in education has been justly extolled, yet it needs a deeper grounding than the current conception of its function. A superficial view regards sense-training mostly in its mechanical aspects. Not a few people regard savages as having better eyesight and hearing than civilized men. Savages do, indeed, notice many things that educated men do not, but this is due to mind-training rather than to any superiority of the sense organs.

It is not unnatural that we should think of the American Indian, trailing his foe through the trackless forest by obscure signs, as having better eyesight than his white companion, who cannot do such things. Yet, if the Indian should look through a microscope, or listen to a modern orchestra, he would be as blind and deaf to niceties as the dweller of the city is in the forest. The difference between the two men is mental, rather than physical. Their minds have been trained to attend to quite different elements of the retinal pictures; their apperception is the real point of difference. A turned leaf, a broken twig, which a white man might not look for or notice, becomes to the Indian a sign of a hidden or fleeing enemy. The retina of the white man's eye would record these things, but they would have no significance to him; but to the Indian they would mean much, for his training has been such as to make his existence, or at least the satisfaction of his passions, depend upon noticing and reading them aright. Another evidence that the retinal picture is substantially the same in all healthy eyes, is the fact that for defective vision we always go to the oculist, never to the teacher. The image on the retina depends, indeed, not on the laws of pedagogics, but on those of physics.

Whenever the mind stands face to face with a new experience whose significance is not grasped, it is in the state we call wonder. This is truly, as Plato says, the beginning of knowledge, the most primary incentive to learn; but if wonder does not give place to apprehension, if apperception does not complete its work, the stimulus of wonder will soon fade into the indifference of ignorance. Take any child for the first time through a museum in silence, and most things will be as surely locked from him as if he stood outside of bolted doors. Who, indeed, but an archæologist can read a tithe of what is implied in a cabinet of Assyrian relics? Truly to appreciate the significance even of an Assyrian brick and its hieroglyphics is to understand an ancient civilization, so different from our own that only the profoundest study of years enables us even dimly to apprehend it. Reversing the illustration, suppose, for instance, that an electric current were now able to start the full tide of life in the mummy of Rameses II., and that he could be set down in the midst of an American city. What a bewildering maze of sights and sounds would crowd upon his senses! What to him would be the myriad applications of steam and electricity, the occupations, sentiments, and pursuits of men? Yet if he could be born again, and live for a few years under American conditions, everything would seem as natural as if it had never been otherwise.

It would seem, therefore, that it depends upon the teacher whether the principle of sense-perception, so firmly urged by Comenius, Rousseau, and Pestalozzi, shall be a fruitful or a barren one. It is quite possible that having eyes we see not, and having ears we hear not. Object lessons may degenerate into mere staring, or they may be made the greatest incentives to understanding and knowledge. The blossom of wonder must become the fruit of understanding, perception must culminate in apperception; or the senses will fail to do their part in the work of education.

(2) Just as the net result of sense-perception in the child is limited by the interpreting power of his present acquisitions, so his imagination, usually thought to be the freest, most spontaneous expression of his being, is likewise conditioned by the range of his knowledge. In our instruction we call upon the imagination chiefly to do three classes of things: (1) to enlarge and (2) to diminish present ideas or systems of ideas without greatly changing the relative proportion of parts, and (3) to construct new creations from old elements by changing relations, and magnifying or diminishing parts. When Gulliver dwelt among the Brobdignags everything was upon an enlarged scale. A man was as tall as a church steeple, a rat as large as a bear, and everything else in proportion. When he went among the Lilliputians he found everything on a greatly diminished scale. A barrel of water was no more than a thimble-full, while Gulliver could step from one street to another over the tops of the houses. These two narratives are extended illustrations of magnified or diminished imaginative reproductions. The constructive imagination has a vast range, from grotesque forms, like satyrs, sphinxes, and dragons, to the noblest productions of in-

vention and art. But everywhere and always the mind can use no elements in these constructions not already at hand as a result of former experience. The teacher, careless of the principle of apperception, unhesitatingly makes drafts that the childish imagination cannot honor. Without ever giving him the elements of geographical knowledge through sense-perception, as, for instance, ideas of a lake, a river, a cape, a promontory or bay, a mountain, hill, valley or desert, swamp or plateau, the teacher asks the pupil to follow him or the book in building up in his imagination ideas of the most complicated geographical structures. It is needless to say that the pupil's efforts to do so are foredoomed to grotesque inadequacy. Similarly in history, with his stock of interpreting ideas drawn from the sorriest country or village life, the pupil is often expected to reconstruct through his imagination the most imposing scenes of the world's history. Yet in teaching geography and history, if the teacher will consciously go to work to enrich and arrange the interpreting ideas of the children, these subjects will enrich and delight the mind through an exercise of the imagination in accordance with the laws of apperception.

(3) Not only is an observance of the rules of apperception of prime importance in sense-perception and imagination, but such observance is indispensable in securing and holding the pupil's interest in that which must constitute the matter of his education. It is not uncommon for us to strive to create interest in study by appealing to emulation, to ambition, to love of praise, approval of others, duty, etc., or by indulging in spectacular display in methods. These and similar devices may enable us to develop a momentary interest, in duration much like the anger of Brutus, who says, —

> "O Cassius, you are yoked with a lamb,
> That carries anger as the flint bears fire;
> Who, much enforced, shows a hasty spark,
> And straight is cold again."

However valuable these transient flashes of interest may be in arousing the mind to activity, certainly the ideal school interest is not reached until the pupil becomes progressively interested in the subject-matter of his education.

These studies are of the greatest value to the child, since they reveal to him what the race has thought and done and felt, both in social and material realms. In them he may see his highest destiny; through them he may realize it. Now, by following the guide of apperception we can make the child progressively conscious of the value of these studies to the development of his own life, and thus awaken a permanent and growing-interest in school work. This direct vital interest in the subject-matter of education is so important, because the interests that touch our souls are the seeds from which the motives of our actions spring. If my interests are in what is low or useless or selfish, my character is likely to receive its stamp from a distorted die; but if natural inclinations, environment, and, most of all, education, can generate in me a permanent interest in what is useful and good, my life is likely to be one of sweetness and light, rather than one of bitterness and darkness.

The first interests of the child arise from wonder, when brought face to face with unknown facts of the material world; hence they are concrete and objective. What is often seen, or is devoid of significance, or is exhausted in meaning, soon ceases to attract. Children soon weary of perfected toys, or those incapable of new combinations, because the apperceptive laws of mental life show that only those objects interest which reveal themselves perpetually in new relations of deepening significance. We come again to the fact that sense-training must merge at once into mind-training; that unless object lessons are viewed merely as starting-points for an internal, spiritual interest, they become a vain thing, useless alike for instruction and amusement.

It is the despair of mothers that the child at one stage of his existence seems little besides an animated interrogation point. Not a new fact comes under his observation without the question, Why? This is his demand for the reason of things. It is a fact full of significance to the teacher, for it shows that the thought or speculative interest is one of the most fundamental impulses of the mind. The teacher who does not consciously or unconsciously observe the laws of apperception, soon quenches this primeval flame, and introduces the mind to that weary round of uninteresting, formal teaching that by courtesy so often goes by the name of education. Shall we not keep alive this divine spark of intelligence, this natural impulse to understand, this native potentiality of the mind which needs but the skill of the true teacher to make it develop into actuality?

A proper mastery of educational psychology enables the teacher to discover and develop every natural interest of the mind, the æsthetic and ethical, as well as the intellectual and objective. It teaches him how to make all knowledge interesting, by showing him how to make it significant in the eyes of the child.

SPECIFIC INVESTIGATION.

What is Apperception?

§ **9.** The term *Apperception* has been a familiar one in philosophy for two hundred and fifty years. In recent times it has been adopted as a part of the language of psychology. The following exposition is intended to present in brief form the substantial results of the investigations of prominent psychologists in this field.[1]

(1) The mind must possess an original, inherent power of reacting against the physical stimulus that comes to it through the medium of the senses, else we should never have any experience at all.

The result of this reaction is, ultimately, the production of ideas. Let us call this original reacting power the will; for it is the function of the will to manifest its activity in the realm of ideas, the outwardly directed physical effort being an accompanying index. Hence we may say that, in order that knowledge shall get a start, the self, in conformity to the will, becomes a necessary element in every sensation, so that if asked, What is a sensation apart from all apperception? we should be compelled to answer, Nothing at all for consciousness, since without apperception we should never have a sensation. This first volitional response of the mind to outward physical stimuli coming through the senses, and resulting in sensations and ideas, is *the primary or initial form of apperception.* It is such because it involves no previous knowledge. That phase of apperception most important in education, however, involves knowledge, and may, therefore, be termed the *cognitive apperception.*

(2) To have sensations and ideas, however, is to have

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[1] For a sketch of the history of the use of the word see the concluding chapter of Lange's "Apperception," D. C. Heath & Co., Boston. The present exposition is in the spirit of Wundt's contributions to the subject, he having fairly incorporated all the essential points of other systems of thought, of which that of Herbart is the most noteworthy. But though conforming essentially to Wundt's theory, the present discussion has some important deviations from that author.

what we call consciousness. This may be viewed in two ways. Comparing it figuratively with the image formed upon the retina of the eye in vision, we may distinguish, first, the whole field of illumination, and, second, the central focus of light, from which the illumination rapidly diminishes to the periphery of the image. If we call all activity within the *field* of consciousness *perception*, then the activity within the *focus* of consciousness, or the point of greatest clearness, may be distinguished by the name *apperception.*

(3) The elements of mental life, as they are presented by the senses, have a varying value in consciousness, those of most subjective worth coming into the focus, and others remaining in outlying portions of the field. The primal activity of the mind in responding to these stimuli has been called the will, so that the ideas that get into the focus of consciousness must have the greatest momentary worth to the will. But that which has value in relation to the will is a *motive*, so that we may speak of the soliciting power that an idea has for the will as its *motive value.* This changes from moment to moment and from stage to stage in the development of the mind. What is a strong motive to us at one time or in one condition ceases to be such at another time, or when the state of the mind has changed.

(4) It is because the spontaneous activity of the mind in its response to sense stimuli is conceived as will, that it is proper to regard the worth that each idea has for the mind as a *motive value.* This value is to be expressed in terms of feeling, whether having its origin in the body or in the contemplation of intellectual or moral truths. To have the later motive value arising from perceived knowledge relations, an idea must enter the field of conscious-

ness, when it may be quickly elevated into the focus, provided it possesses enough motive value. This will depend, not so much upon its actual value considered in itself, as upon the subjective worth it has for a mind that is constantly changing its tone in obedience to altering content of consciousness. We may say, in general, that the motive value of an idea at any given time will depend upon the worth the idea appears to have for the well-being of the self. It may range from the satisfaction of the simplest physical want arising from the bodily organism, up to the realization of the impulses of the self in the loftiest realms of intellectual and moral life.

(5) Though the mind through its will activity creates ideas, it does so in obedience to stimuli coming from sources independent of itself. On this account the original content of mental life depends in large degree upon causes over which the mind has no control, but it may be said that all ideas have been more or less perfectly apperceived before they are recognized as old and familiar. Recurring ideas that have been apperceived are recognized as such, and no longer command the attention necessary to bring them to the focus of consciousness, unless they possess a motive value sufficient to call for a more complete apperception. They, it may be said, usually constitute the main body of ideas in the field of consciousness — they are perceptions which may, however, be called into the focus at any moment.

(6) New ideas entering consciousness, whether occasioned by physical or psychical processes, usually possess a sufficient motive value to raise them into the apperceiving center. They can obtain significance, however, only when they are consciously related to other ideas. In order to establish these relations, the mind must hold in the

focus of its attention, not only the newly entering idea, but also those to which it is to be related. The impossibility of holding one of two related ideas in the focus of consciousness, and keeping the other in the background at the moment of establishing the relation, seems to substantiate this view. We may say, therefore, that in an ordinary act of apperception the mind holds under the focus of its attention not only the new notion, but also the other ideas to which it must be related in order to have significance.

§ **10.** In order that the function of the process of apperception may be more fundamentally understood, we shall need to see some of the important relations it bears to the association of ideas.

(1) The nature of consciousness is such that the mind tends to unite into a whole, either homogeneous or made up of related parts, all that enters it at any given time. Lindner formulates the following laws for this union or fusion (association) of ideas.

a. Simultaneous ideas tend to fuse; i.e., flow together into a single act of cognition. (They form a complete fusion if they are different pictures of the same thing, as, for example, of a church, or house, or college.)

b. Simultaneous ideas of different natures fuse without arrest into a total idea or complication. (*Cold* and *white* fuse or unite into the idea *snow*, since the two ideas are of different natures.)

c. Simultaneous ideas of opposed nature first arrest one another (resist union), and then fuse with degrees of intensity remaining from the arrest. (In the idea *home* are many component ideas that will not fuse completely, as *house, parents, brother, sisters, surroundings, etc.*, yet the whole forms one picture more or less definitely seen.)

Now, this primary tendency of the mind to unite or fuse all its simultaneous impressions is the most elementary meaning of the association of ideas. Even here, however, the process of apperception goes on, though, in distinction from those phases in which the will is more energetic, we call it *passive apperception.* The correlative of *passive* is *active* apperception.

(2) In what has been called passive apperception the motive value of the leading idea is single and unmistakable and strong enough in its solicitation of the will to bring the idea within the focus of consciousness, requiring no balancing of motives, or reflection upon which idea shall be chosen. In *active* apperception, however, the line of action for the will in the choice of the ideas that shall be most prominent in the focus is not fixed by the unmistakable motive worth of one idea above another, but there is a complexity of motive worth in different ideas that compels the mind to pause, to consider, and finally to select the idea and its related group that shall occupy the focus of consciousness.

We may distinguish also simultaneous and successive association of ideas. In simultaneous association the ideas fuse into a total, or single complication, none of them retaining their original individuality. (In the idea *salt* are fused the whitish color, the hexahedral form, the peculiar taste, the rough, hygroscopic feeling, the peculiar crackling when pressed together, etc.) In successive association each idea, though associated with others, preserves in a measure its individuality, so that we have a series of ideas linked together as a result.

(3) It may be said in general that our ideas are synthesized from simpler elements, some of which are bound to be more powerful, or possess more motive worth to the will, than others. Since the mind cannot attend to all these ele-

ments at once, in passive apperception the ideas that shall attract the most attention, or, in other words, that shall be called into the focus, are those that bring with them the strongest attraction for the will. This attraction, or motive worth, will depend partly upon the outside relations of the things that occasioned the appearance of the ideas in consciousness, and partly on the subjective state of the mind. Not only does the mind arrange and relate the elements given to it at one time by the senses, but it may be questioned whether any cognitive apperception is complete without the reproduction of related ideas that were not in consciousness at the time of the reception of the new. How the new ideas are related to the old will be better understood when we examine the process of apperception from the standpoint of the judgment.

(4) As the term *successive association* implies, the mind may make associations in which the ideas, though associated, maintain their individuality — they do not become so completely fused as to lose their identity as separate ideas. In this way the series, or chain of ideas, arises, in which the members must be united in some sort of relations even if merely fanciful and subjective ones. These relations are of necessity most clear and distinct between the ideas that successively occupy the focus of consciousness. Now, since these ideas are related, it would seem that any given member of the series has its motive worth to the will partly determined by its predecessors, and that it will have an influence in determining which idea shall follow it into the focus. This makes the association of ideas in the series a rational process. Giving ourselves up passively to the train of ideas, we see how we may arrive at the most unexpected results, yet be able to perceive how the motive value of one idea indicated what the next member of the series should be.

(5) The motive worth of an idea for the will is the *feeling* united with it, so that we may consider feeling the driving force for the rise and fall of ideas; or, in other words, the feelings connected with ideas determine which shall occupy the focus of consciousness. Feeling, however, is the most subjective phase of our mental life. Two persons must go through substantially the same mental process in the mastery of a purely intellectual problem, such, for instance, as mathematics furnishes; but their feelings, even about such matters, are likely to be quite unlike. In nothing are we so individual, so different from others, as in our feelings and emotions. But since it is feeling that gives the motive value to an idea, we can understand why apperception has such high subjective significance. This shows why the ideas awakened, for example, by a walk in the forest would be so different with different people; why one would attend only to the plants, another to the animals, another to the poetic ideas suggested, another to elevated thoughts about the creator of all. It is here, again, that we see the wonderful potency of *interest* in education. An interest in a subject is only a constant set of motive values for ideas, so that as soon as such a mental tendency is established, countless ideas claim the apperceiving power of the mind, that would otherwise pass unchallenged.

(6) In its active phases apperception is no longer guided by the single motive, but is delayed on account of the competing motive values of several ideas. There is deliberation, and finally choice, in accordance with temporary or permanent interests. Apperception now loses the more or less mechanical aspects seen in its passive manifestations, so that the train of ideas is fixed more in accordance with rational content, or, at any rate, by ruling interests of the mind. The fleeting aspects of feeling give way to the

establishment of more permanent modes of feeling, or interests, thus determining still more subjectively the direction that apperception shall take.

(7) It is through apperception that interpreting groups or masses of ideas are formed, thus making it easy to determine the significance of large numbers of facts. Our knowledge becomes in this way compact and manageable. On the other hand, apperception enables us also to examine the members of a group, one by one.

(8) Not only can apperception be studied along the lines laid down in the present section, which considers the subject from the standpoint of the idea or notion as a factor of mental life, but it may also be investigated from the remaining topics in logic; viz., the *judgment* and the *syllogism*. The next section contains a brief analysis of apperception from the standpoint of the judgment, while Chapter iv. contains an examination of the topic from the side of the syllogism.

§ **11**. It is a fact well known to psychologists that the primary function of intelligence is to formulate thought in the judgment. Whatever can be a matter of thought at all can be, and indeed in the last analysis *must* be, reduced to the form of the judgment. The nature of the judgment is seen in its symbol, or representation, the *sentence*. This is necessarily the junction of subject and predicate by the copula, expressed, or implied in the verb. There are three possible relations between subject and predicate, two of which in themselves add nothing to our knowledge: —

(1) The subject may be more general than the predicate; as, *An animal is a dog*. (Analytical judgment.)

(2) The subject and predicate may be identical; as, *A dog is a dog*. (Identical judgment.)

(3) The subject may be less general than the predicate; as, *Carlo is a dog*. (Synthetic judgment.)

The first of these forms has no value in extending our knowledge when the subject is understood, since the predicate is plainly seen to be only a *part* of the subject. When Hamlet wished to withhold information, he said, —

> "There's ne'er a *villain* dwelling in all Denmark
> But he's an arrant *knave*."

In this case the subject is a broader term than the predicate, and already contains it by implication. There is one case, however, when this form of the judgment is of value; viz., when the subject of the judgment contains more than is clearly seen by the speaker. Thus in the judgment, *This body has weight*, only one thing is *asserted*, but *extension, impenetrability, origin, purpose, etc.*, are all *involved* in the subject *body*. The pedagogical significance of this fact will be dwelt upon later.

The second, or identical, form of the judgment is useless for the extension of knowledge, except when the *form* of the terms is different. Thus, $4 = 4$, $a = a$, have no value; but $2 \times 2 = 4$, or $(a + b)^2 = a^2 + 2\,ab + b^2$, and other mathematical equations furnish us with a valuable instrument for working out results.

The only form of the judgment, therefore, which really widens our knowledge is the third, or that in which the predicate is a broader term than the subject. Thus in the word *earth* there is not involved the idea of *revolution*, so that when I say to one who does not know the fact, *The earth revolves*, I have extended his knowledge through the synthetic judgment. So in the judgments, *Carlo is a dog, Most coral is red, Newton discovered the law of gravitation.*

In every synthetic judgment, the predicate is a more general term than the subject, but we need, at this point, to perceive clearly the relation of content and extent in these terms. Should we think only of extent and content in the strictly logical sense, the judgment, *This object is an animal*, it is plain to see would convey but very meager knowledge, for the single-celled amœba is an animal, and has but few characteristics common to all animals. Should I say in answer to the query, *What kind of an animal? It is a vertebrate*, I should greatly enrich the knowledge, for the content is much enlarged. Continuing, I say, *It is a mammal; it is carnivorous; its family is Felidæ; its genus, Felis; its species, Felis domesticus Linnæus*; *its variety, Angorensis.* At each stage, I have narrowed the extent, and enriched the content of the notion of the object with which I started.

But it must be remembered that with a mind which has had any considerable experience, the term *house-cat*, for instance, though logically itself restricted to a comparatively small extent, really presupposes the more extended terms, *mammal, vertebrate, animal.*

We may say, then, in general, that the amount of information conveyed by any given predication depends upon the wealth of content and the implied breadth of extent which the predicate-term has for the learner. If, then, perception gives me a new notion, I shall evidently understand or apprehend it when I can subsume it under some familiar predicate having greater extent and richer content than the new object of thought has presented to my mind. From the standpoint of the judgment, then, apperception may be defined as follows: —

Apperception is the subsumption of a notion, usually newly given and more or less individual, under a predicate which is more complete in content and extent, and which is usually older and more familiar.

Apperception does not always follow perception immediately, for years sometimes intervene between the learning of a fact and its comprehension. In general, a period of reflection commonly precedes the complete apperception of a new subject of knowledge; though, as Lazarus says, "The apperceiving conceptions usually stand, like armed soldiers, within the strongholds of consciousness, ready to pounce upon everything that shows itself within the portals of the senses, in order to overcome it, and make it serviceable to themselves."

The new is not always apperceived by the old, for it often happens that old and apparently well-grounded ideas are revolutionized by some new-found truth, which compels a readjustment. This has often been the case in science. The Copernican theory of the solar system compelled a readjustment of the mediæval religious conceptions which had grown up in accordance with the Ptolemaic idea that the heavens revolve about the earth. As Volkmann says, "The indisputable evidence of a new perception necessitates the already firmly fixed theory to undergo modifications; new experiences unsettle old convictions, and in general break up old and cherished notions." If such a transformation comes on suddenly, it is characterized by violent emotional excitement, as when we discover treachery in one whom we have regarded as a friend. The same phenomenon is seen in the changing of one's political convictions, or in suddenly changing from a life of sin to one of righteousness, through religious conversion.

PART II.

NECESSARY STAGES OF RATIONAL METHODS.

CHAPTER III.

APPERCEPTION OF INDIVIDUAL NOTIONS.

§ **12.** We have seen how apperception, or the subsumption of new subjects under old predicates, is the condition of understanding. It must at the same time be the condition of all *interest*, for the mind has no interest in that which it does not understand. Not all things understood are interesting, but nothing not understood, in some degree at least, can possibly awaken interest. There are, therefore, two powerful incentives for the teacher to study the conditions of apperception, — the desire to have his pupils comprehend, and the desire to have them interested.

§ **13.** It might, at first thought, seem that the native spontaneity of the mind would do all that is necessary to bring up these related conceptions which are to serve as predicates for the new notions acquired through instruction, but reflection will show that this is true to a limited extent only. Who has not seen children completely baffled by some mathematical relation, which a skillful question or two would reveal? Is it not a daily experience of the teacher to find pupils failing to comprehend statements in reading or grammar or number or natural science or geography, simply because their own spontaneity of mind is not sufficient to supply those interpreting ideas, which the teacher might easily cause to appear in consciousness? *It is, therefore, the first great function of the teacher to prepare the way for the rapid and efficient assimilation of that knowledge which the study hour or the recitation period is to furnish.*

§ **14.** The teacher's activity in this first great department of education is naturally of two kinds: (1) *The* ***preparation*** *of the child's mind for a rapid and effective assimilation of new knowledge*, and (2) *The* ***presentation*** *of the matter of instruction in such order and manner as will best conduce to the most effective assimilation.*

PREPARATION.

§ **15.** From what has been said, it will be seen that this term means that preliminary effort of the teacher, which is designed to prepare the mind of the pupil for a ready apperception, or assimilation, of the new knowledge about to be presented.

§ **16.** To understand the real nature of this process, we must recur to the first form of the judgment, or that form in which the subject involves more than is seen in the predicate. The child when he enters school knows many things, has coupled many predicates to many subjects; but neither at this stage nor at any subsequent stage of his education has he coupled to his subjects of knowledge all the predicates involved in them. According to the law of apperception no child can really learn and understand any new knowledge for which he has not a store of related conceptions which can be applied as predicates. It may be, and most probably will be, the case that these needed predicates are held in the child's knowledge only by *implication*, and that it will need a *preparatory effort* on the teacher's part to bring the needed *apperceiving conceptions* to the full consciousness of the pupil. Preparation, therefore, seeks to recall former knowledge, and to bring to consciousness those needed and implied conceptions which through predication should reach out like so many spiritual arms, to embrace and draw into living relations to themselves the new elements of knowledge which it is the business of the hour to cause to appear in the mind of the child.

§ 17. Where, as with small children or in certain kinds of oral work, no lesson for study is assigned, this preparation will take place, in general, at the beginning of each recitation, though it will often happen that a general preparation covering a whole section of a subject may render much preparation on daily subdivisions unnecessary. This matter will be further discussed under the subject of *method-wholes*. In classes where lessons are regularly assigned in text-books, the main part of the preparation should be made when the lesson is assigned for study. A repetition of the same at the beginning of the recitation may be helpful.

The nature and amount of preparation necessary will depend upon the mind of the pupil. In general, one year's work is a preparation for the next; so of the work of each term or month or week or day, and it is on account of the laws of apperception that gaps in education are to be avoided. But this general preparation does not often suffice. Though facts enough to explain the new lesson may have been previously taught, the mind may, on account of forgetfulness, or because it is busied with other things, remain unconscious of them at the time when they are needed to illuminate the new and make it instinct with meaning by supplying the appropriate predicates. Or, if the mind recalls the older and related conceptions, they may yet be dim and weak, or may fail to appear in the best order, or they may be mere feeble general impressions. Under such conditions, it is needful for the teacher to make special effort to put the minds of his pupils into proper relations to the lesson about to be imparted.

These efforts may be considered in the following order:—

(1) A clear and attractive statement of the object of the lesson, or the end to be reached. Thus, for example, the teacher may say, "We have learned that the earth is a great ball or globe which is free in space. We will now consider whether it is at rest or in motion." Or, "We have seen that a fraction is multiplied by multiplying its numerator; let us see if it can be multiplied in any other way." Or, "We have found that the nature of thought gives rise to the subject, the copula, and the predicate, or attribute, of the sentence; let us see, if possible, what property of thought gives rise to the adjective." But little thought is needed to see that it would be very unpedagogical not to have the pupil understand from the beginning what the aim of the lesson is. In the first place, an attractive or forcible statement of the end to be reached, helps to dispel from the child's mind the distracting thoughts which may be sporting there, and to prepare the way for what the teacher wants to impart. Next, it helps to put the pupil into the frame of mind in which it is desired he should work. It excites expectation, stimulates interest, and allows instruction to begin under favorable conditions. It gives the pupil a favorable impulse towards right willing, and disposes him to self-activity in the solution of the appointed task. But when the end to be reached is not indicated, the danger is that not only the above-mentioned advantages will be sacrificed, but that the pupil, not knowing where he is going, will become confused, especially if

he is kept long in the dark. He cannot go forward intelligently, nor can he retrace his steps. His mind is bewildered by perceiving results for which he is no longer able to account. But if he advances with a clear consciousness of the end he is striving to reach, he will not become confused, unless the explanation itself is confusing.

(2) With the purpose or aim of the lesson about to be presented always in view, it is plain that the concepts resulting from the analysis of the present store of knowledge should be derived or developed in unbroken and virtually connected chain from the beginning to the close; for in this way the mind reaches its greatest capability of taking on and assimilating new knowledge. But if the time is spent in recalling past concepts without any regard to their co-ordination and logical connection, or in developing the non-essential, it is plain that the child's mind will not be so ready to apprehend the new lesson in its full significance. The teacher should, therefore, endeavor to discover which of those main concepts, already within the grasp of the child, need to be recalled or derived in order best to master the new lesson. He should then arrange these in their logical order, and proceed to bring them to the child's consciousness in this order. The ease with which this logical arrangement can be secured will depend largely upon the logical arrangement of the subject-matter of the daily lessons. If this is what it should be, but little effort at special arrangement is necessary in the preparation. The more remote the new lesson is from the recent study of the child, the more elaborate must be the preparation. Ordinarily a few sharply put questions will suffice to place the pupils in a frame of mind best adapted to understand the new lesson.

(3) The preparation and the new lesson should not be

mixed up together during the preparation, for this is likely to lead to confusion of thought, and may lead to a lack of interest. A foreshadowing of what is to come, however, may secure increased interest and mental activity. If, when a new truth is presented, a pupil discovers that he had dimly foreseen it, his pleasure in the acquisition may be greatly increased thereby. A skillful dramatist never fully reveals his plot ahead of its unfolding, nor does he, on the other hand, ever allow any great but entirely unexpected culmination to occur. Every stage in his drama is a preparation for the next, but not a revelation of it. The revelation of the unknown but not altogether unexpected is a fine art with the dramatist and the novelist, and should be with the teacher.

(4) The preparation should be so extended as to cover the entire matter of the new lesson, or such part of it as may be regarded as a method-whole, in order that time and interest may not be sacrificed by tiresome explanations after the presentation of the new matter has been begun. Wherever much of this appears necessary, it is certain that the preparation has been inadequate, or that the matter is not suited to the present mental acquirements or ability of the pupils.

(5) As to the form of the preparation, it may be remarked that a free exchange of thought between teacher and pupils in the form of question and answer, or conversation, is the best. Anything that smacks of examination is out of place, since it is destructive of that free movement of thought which is here so desirable; furthermore, it effects no valuable result, besides being deadening to a direct interest in the subject. Pupils delight in an exercise which gives free play to their individuality, nor should this free play of thought be rudely checked, even though

matters important only in the eyes of the child should be developed. A skillful teacher can easily guide the free thought of the pupils to the main issue, without checking its spontaneity; besides, the announced *purpose* of the lesson makes it easy to keep out irrelevant matter.

(6) Repetitions, and even drill upon the main points brought out, may be profitable, but an exhibition of deep earnestness of manner or tone is out of place in the preparation. This should be reserved for a later stage, when it is desired to impress some new truth brought out by the lesson.

When the teacher has done as much as he thinks profitable in way of preparation, he will proceed, as a matter of course, to the presentation of the lesson.

PRESENTATION.

§ **18.** It is not to be supposed that the child possesses so much knowledge when he enters school that there is involved in it all that he will subsequently need to know, so that a mere analysis of what he now has will reveal all that he should ever have. In this sense Jacotot's dictum, *All is in all*, is false. New knowledge must be imparted. Old predicates must be supplied with new subjects in which the predicates are not already involved. These new predications enrich former ones, so that the subsuming of new subjects under old predicates widens and enriches old conceptions, which in turn extend the significance of subsequent elements of knowledge. Omitting the second, or identical, form of judgment, *A is A*, which as we have seen is valuable only as a mathematical instrument for ascertaining numerical relations, we come to the third form of the judgment, in which the predicate is a broader and deeper term than the subject. The first kind of judgment has been called *analytical*, because an analysis of the subject shows that the predicate was already involved in it. The third, or last, kind of judgment has been called synthetical, because the predicate is something united to the subject, — something which is outside of the subject, — not implied in it. In the word *Carlo* is not involved the idea *dog*, so that the sentence, *Carlo is a dog*, expresses a true synthetic judgment. It is evident, then, that if the child is to learn anything new, the teaching must be of this synthetic, or additive, nature. Without the gaining and assimilating of new facts, or elements of knowledge, there can be but little advance in mental growth. At this stage of our investigation, it is entirely immaterial how these facts are obtained, so that they are *new*, not already involved in what the pupil knows. Facts may, for example, be obtained by induction or by deduction, or they may be gained through a primary use of the senses; they may be learned from a book or from the lips of the teacher. In any case, *presentation* sees that these facts are brought to the consciousness of the pupil in such a way that they may be readily assimilated, or, in other words, be properly understood.

§ **19.** An exhaustive treatise on presentation might consider the whole course of development for each branch of study, and also the relations of inter-dependence among the various subjects of the curriculum, because each of these departments of inquiry has a bearing on the reception and assimilation of knowledge. One large German pedagogical school advocate the presentation of most subjects according to what is called the *historical stages of culture;* this position being taken, on the theory that each child, in its development, passes through all the stages of thought through which the world has passed in its historical development. We should, therefore, say they present to a child of any given age that stage in the development of the subject in which the world was at the time now typically represented by the child. For example, Ziller and his followers recommend the following order of topics for religion and history: first year, "Grimm's Fairy Tales" (Märchen); second year, "Robinson Crusoe;" third year, Bible stories from the time of the patriarchs, "Legends of Thuringia" (Thüringer Sagen); fourth year, Bible stories from the time of the Judges, then of the Kings, "Nibelungen Tales;" fifth year, Bible stories from the time of Christ, History of Henry I., Otto I., Charlemagne; sixth year, Bible stories from the time of Christ continued, Migration of the Nations, Roman Empire and the Pope, The Crusades, The Middle Ages, Rudolph von Hapsburg; seventh year, The Original Congregations or Churches, The Apostle Paul, Discovery of America and its first settlement, History of the Reformation, The Thirty Years' War; eighth year, Instruction in the Catechism, "Frederick the Great," The Napoleonic wars for independence, The Restoration of the German Empire.

This school make religion and history the central subjects for the work of each year, and seek to relate all the other instruction to them. This is the idea of *concentration*, according to which no subject of study should be isolated from the others, but all school study should be related to some common center. Other eminent schoolmen claim that the arrangement and co-ordination of school studies should be quite otherwise. But, however interesting these topics may be in themselves, they lie beyond the range which has been set for this treatise on methods.

§ **20.** The questions of the selection, arrangement, and co-ordination of school studies being excluded from our present consideration, we have now to examine the guiding principles of a rational daily presentation of the matter of instruction.

The Law of Successive Clearness. — We have seen that any advance in knowledge comes by subsuming new subjects under old predicates, — that this is the essence of apperception, or mental assimilation. But this mental movement is a movement in *time*. It requires a certain amount of time to gain a clear perception of the new elements of knowledge, whether these elements originate through the senses or through the understanding. It also requires a certain amount of time for the predication. Besides these two elements, there is an intellectual element of thought, which enables the mind to perceive relations between new and old elements of knowledge. As has been hinted before, there is a reciprocal action between new subject and old predicate. If the older and broader predicates enable the mind to understand the significance of the new elements of knowledge, so, on the other hand, do the new subjects broaden and complete the former conceptions which serve as predicates.[1]

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[1] Dr. W. T. Harris says (Rosenkranz, "Philosophy of Education," pp. 75, 76), "Perception is increased immensely in power by adding to it conception, which brings the aid of the general image in which are summed up all previous perceptions; thus perception re-enforced by conception is an individual activity re-enforced by the sum-total of the race activity, or at least by the sum-total of all previous activity of the same individual as well as by what he has learned from his fellows. Thus, too, perception is still more increased by adding to it the thinking activity, which perceives necessary relations. Agassiz looks at a new fish from the Amazon River, and sees at once its type and its variations; knows at once the great mass of its properties, functions, faculties, habits, and history, simply by its classification under already known genera, species, and subclasses. This enables him to distinguish at once its variations from the general type, and to see the significance of its peculiarities. In the same

Upon the fact that certain easily distinguishable amounts of time are required for this reception and apprehension of individual notions, and the interaction between individual and general conceptions, is based THE LAW OF SUCCESSIVE CLEARNESS.

§ **21.** This law was first announced by Ratich, and was afterwards developed and applied by Herbart and Ziller. According to this idea, the matter of instruction must not be presented in the mass, but in small, logically connected sections, to each of which, in succession, the pupil should give his undivided attention. In this way, one by one, individual notions are clearly perceived. But, as already explained, individual notions are not assimilated until they are subsumed under predicates. It is thus evident that after the mind has given its concentrated attention to each of the successive sections of the lesson in turn, these subdivisions must be brought into close relation and connection; i.e., must through predication be brought into a unity in consciousness. To neglect the division of the lesson into

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manner a botanist (Professor Gray, for example) glances at a tree as he passes it rapidly, from the car window. He sees its resemblances and its differences, however, in that rapid glance, because he subsumes it under all that he knows; all that is known, in fact, as the aggregate result of all observations for thousands of years. By recognizing its series, class, sub-class, order, sub-order, tribe, genus, species, and variety, he is instantly in possession of information enough to make a library of books on the subject of that one tree. He saw enough, too, in the rapid glance to inform himself of its individual differences, its particular size, shape, and condition, in so far as these were peculiar. Contrast this with the information obtained by the sense-perception of an observer endowed with excellent sight but no knowledge of botany. Science, which is the product of conception and thinking, thus re-enforces sense-perception, which demands for its perfection those higher activities; and, *vice versa*, thinking and conception, which deal with the universal, or the possibility and the process which creates particular individuals, demand sense-perception to take cognizance of those individuals."

minor unities, or sections, would be to sacrifice clearness of individual notions, and to get only crude general impressions of the whole. On the other hand, to fail to associate the parts of the lesson, and to bring them to consciousness as a logical unity, would be to leave the mind distracted by the apprehension of a confused mass of disconnected details. These two steps, the absorption of individual notions, and their apperception as connected, Herbart compares to the process of breathing, calling them the *inspiration* and *expiration* of the soul. Our maxim, *step by step*, has to do with this process, but it is incomplete, for it suggests only the subdivision, without hinting at its purpose, the clear perception of individuals and their proper synthesis in consciousness.

§ **22.** The matter of instruction must, therefore, be presented in natural subdivisions, thus giving resting-places which allow the mind to recover from its absorption in the individual, and to fortify itself against distraction by bringing its knowledge into wholes. How minute the subdivisions of the lesson should be, must be determined by the age and mental strength of the pupils. Arithmetic and mathematics in general furnish the most perfect exemplification of the truth of the law of successive clearness, and of the necessity of obeying it. If the steps of reasoning in a problem are not separated and mastered one by one, there is instant danger of confusion, though the amount which a pupil can master at one impulse grows with advancing mental ability. The same law holds, also, in all other branches. Take, for example, the first lesson in the Second Reader. If the books are opened, and the pupils are directed to read at sight, the probability is that the result will be a failure. All the difficulties come at once upon the pupil. Many of the old words will not be recognized in their new surroundings, while the new words can of course not be grasped at once, nor can the new thought. In accordance with this law, the teacher must determine what the difficulties are likely to be, and then overcome them one by one. He should, for instance, refresh the minds of his pupils upon those words of the lesson which they have had before, but which they may not at once remember. He can do this by writing them upon the board in familiar sentences, or by pointing to them on the chart, or by spelling them out with detached letters. Then he must give instruction upon new words. He might, when the pupils know the subject of the lesson, easily draw from them the *ideas* likely to be found in such a lesson. He could then place upon the board the new words representing these ideas, and by spelling, syllabicating, phonic analysis, etc., impress them upon the minds of his pupils. The reading may now proceed with some prospect of success, for the teacher has observed the law of successive clearness, has proceeded step by step.

§ 23. **The Series.** — Since all mental activity presupposes time as its necessary condition, it follows that all our perceptions, and knowledge in general, so far as one element does not fuse or coincide completely with another, must be acquired and held in time series. Upon the intimacy of association depends very largely the power of reproducing, or remembering, all the numbers of a series when one of them is given. It follows from this, that it is a prime duty of the teacher to see that the elements of what is presented are arranged in natural series, so that intimate and lasting associations can be formed. As an illustration of how easily even bare words can be held if associated, let the reader note the following list of ten words, thinking as he reads of how each word suggests its successor: *Glad-*

stone, quarry, blasting, dynamite, Anarchists, Haymarket, meadow, sheep, wool, protection. Having done this, lay aside the book, and repeat the list from memory. It is quite as easy to repeat it backward as forward, or to begin with any word of the series, and recite either way. Hundreds of words can be associated in this way, and easily recited forward and backward or from any intermediate word. But if we take ten unassociated words, we shall find much mental effort necessary to accomplish the same results, thus: *quarry, Haymarket, blasting, meadow, dynamite, wool, Gladstone, sheep, protection, Anarchists.*

Few lessons can or should be arranged in this artificial way, but the laws of association as presented in our psychologies should be studied and constantly applied. This natural coherence of parts is one of the indications of a good text-book. Beware of the book which presents a mass of disconnected details. An observation of the laws of association in the formation of the series renders learning more easy and more permanent. This is especially recommended for those persons who have a poor verbal, or mechanical, memory.

It is often necessary to form the series, even when direct association cannot be appealed to, as in the case of arithmetical tables. Time is an important element in fixing any series, and especially those of mathematics. Enough time should be given, so that any member, rising into consciousness, will instantly and surely recall the others. Thoughtful and constant repetition is essential to success in learning a series of disconnected facts.

§ 24. Since knowledge is most easily gained and longest retained by an observation of the laws of association in the formation of the series, it is easy to see that it would be most unpedagogical to make a practice of destroying or breaking up the series, by the insertion of new, or the subtraction of old members.

It is not difficult to see the loss which must occur in instruction, if, after a series has been laboriously fixed in the mind of a child, so that he is master of it, the teacher should proceed to undo his work by breaking up the series. Suppose, for example, a pupil learns a map-lesson in geography in a given grade. This lesson forms a series in which each member is related to others of the series, and serves to call them up. If now, upon going into the next grade, half a dozen new members be inserted into the former series, it is plain that the first series is destroyed, so that the injected members compel the learning of an entirely new series. This kind of procedure would, if systematically continued, result in the constant formation and destruction of series, and thus cause great educational waste. If it be found necessary, however, to insert new matter into an old series, this should be understood by the pupil, and the amended whole be treated as a new series.

It is possible, however, so to arrange instruction that each new fact taught shall be but an onward step in the development of the subject, causing only an *extension*, and not a *destruction*, of former series. This is illustrated in arithmetic, for example, in the successive mastery of tables; in history, in the continuation of topics taught in a more elementary form in the lower grades; in grammar, in the more and more elaborate modification of the principal elements of the sentence by means of words and inflections. In geography it would seem that names of places, rivers, etc., should be taught in a series but once, and that rather late in school life. The earlier grades should be learning series which will not need to be destroyed later through the introduction of new matter.

§ 25. **Fixing Series in the Mind.** — In order to impress it firmly on the mind, and to secure intimate fusion, or association of its parts, the series arising from each subdivision of the lesson must, without undue haste, be repeated often enough and in enough different ways, so that the members will have sufficient time to become firmly united (Ziller).

Next to the *formation* of the series in instruction comes the need of fixing it in the mind. This, as we have seen, needs time. It needs, also, a constant attention to the matter in hand. *Repetition* gives the *time*, and skill on the part of the teacher will secure the *attention*. Every teacher knows that repetition without attention accomplishes little. One of the chief purposes of *device* in methods is to secure the requisite attention for the mastery of difficult series. Novelty of device is worthy of consideration, for what is new claims the attention of children.

CHAPTER IV.

TRANSITION FROM INDIVIDUAL TO GENERAL NOTIONS.

GENERAL VIEW.

§ **26.** *It is a chief business of education to pass from distinctly perceived individual notions to clear general notions (Pestalozzi).*

We have seen that without individual notions, knowledge, and consequently education, cannot begin; and that without attaining to the general notion intelligence cannot be human. In these two facts is implied the truth of Pestalozzi's saying. It is this truth we try to express in the terms, *education (educo), drawing-out process, mental power; depth of insight, genius,* etc. Some have imagined the drawing-out process to mean getting from the children facts which have been taught to them, and in their original form; i.e., drawing out at the faucet what has been poured in at the bung! If the drawing-out process means anything, it means the passing from the particular to the general, the transition, through reflection, from individual to general notions. If pupils perform this transition but imperfectly, however, they become lost in the individual; "they cannot," as one writer expresses it, "see the woods for the trees." Who does not know people who are able to take no more than a microscopic view of things? Who does not know teachers that unceasingly cram their pupils with individual facts, having but little regard to their true meaning and their relation to the significant general truth which may be derived from these facts, in themselves entirely insignificant?

Twenty-five hundred years ago, Socrates taught men in the streets of Athens. He did not, however, spend his time in imparting new knowledge. It was not the individual horse, but the universal horse which claimed his attention. He said he was helping men to give birth to their ideas. Not ideas which they had, but could not express, but general truths implied in their knowledge, which they had not been able to derive alone. The Socratic method, therefore, is but *one* of the stages in any complete system of instruction. It seeks not to impart new facts, nor to assist in the assimilation or understanding of new knowledge through the mediation of former knowledge, but is concerned solely with the derivation or abstraction of the rational content potentially contained in any given body of facts; i.e., it tries to discover what is the general, or necessary, truth contained in any given body of individual notions.

It is further evident that education must make it a special business to teach the child to pass easily and securely from the individual to the general, because the generalizations of children, savages, and uneducated or poorly educated persons are very elementary and incomplete. They do not contain all the characteristics common to a given class, nor do they exclude all characteristics which inhere only in certain individuals. The untrained thinker is content with *types* chosen from among individuals; so that, even in the formation of general conceptions regarding things, the mind must be trained to distinguish the essential from the non-essential. But if this is true in *things*, how much more must it be true in regard to a perception of the necessary relation of things, and in respect to what is essential and what is non-essential in character. Any general, for instance, knows enough to fight when he is surrounded and attacked, but not every one sees, as Grant did at Chattanooga, how the placing of a battery here, the arrangement of troops there, the forward movement in another place, will cause the frowning batteries to retreat, and the heavy lines of the enemy to roll back like clouds before the sun. Two men may have equal knowledge of the elementary forces in physics; the one sees the relation of these forces, and constructs a useful machine, the other allows his knowledge to lie inert and fruitless in his mind. Two lawyers may have the same knowledge of the facts in a law case; the one sees the relation of things, that is, sees the general truth involved in the particulars, and wins his case. He sees the points; the other sees all but the points. The one has learned to pass, by reflection, from the individual to the general; the other has not.

The necessity of proceeding from the individual, through reflection, to the general, as an educative process, has always been recognized by the great thinkers. "Perceptions without conceptions are blind," says Kant, just as "conceptions without perceptions are empty." This means that intelligence cannot stop with the individual, but must through its own activity find the universal in the particular.

Lessing, in his treatise on the fable, says, "Why is there in all sciences such a lack of discoverers and independent thinkers? This question is best answered through another, Why are we not better educated? God gives us the soul, but *genius, talent, ability* we must get through education. A boy whose whole mental powers are, so far as possible, constantly extended in every direction; who is accustomed rapidly to compare all that is daily added to his store of knowledge with what he knew yesterday, in order to see if through this comparison he does not come upon things which were never told him; who is constantly led out of one science into another; *who is taught to rise from the particular to the general as easily as to descend from the general to the particular again; — such a boy must become a genius*, or one can become nothing in this world."

It is our present duty to inquire into the nature of this process of passing from the individual to the general, in order to throw as much light as possible on methods of teaching.

§ **27.** Each general notion necessarily implies a number of individual notions to which it relates. It is plain that that which is common to two notions cannot be perceived as common *unless the two notions are both in consciousness at the same time.* Simultaneity is, therefore, a condition of all mental association. There is, also, a constant tendency to associate in some way things present to consciousness at the same time; and, with untutored minds, even to associate simultaneous or successive events as causally connected when no such relation exists. Thus, if certain events are observed several times to be simultaneous with a given phase of the moon, superstitious people are likely to connect this phase of the moon and the events as cause and effect. It is evident, at once, that were there nothing but the original time connection of perceptions possible, our knowledge would be but a chaos of accidentally associated notions, and that any comprehensive general notions would be impossible.

§ **28.** *The mind must, therefore, be trained to break up those accidental, historic associations, and to form new associations which shall accord with the true nature of the notions associated.* In other words, before any general notion can be formed, memory must bring together in consciousness, a number of truly and logically related individual notions, which were, perhaps, historically separated in the order of their original perception.

§ **29.** We can, then, see likeness and difference in two or more notions, only when they are simultaneously in consciousness. It is equally evident that, in order to perceive these likenesses or differences, *comparison* of the various notions is also necessary. If, in this comparison of notions, we associate those things which naturally and of necessity belong together, we are cultivating *thought*, or *insight ;* if, however, we make arbitrary and fanciful connections, we are cultivating *imagination*. This discussion will be confined to those associations with which *thought* or insight is concerned.

§ **30.** Comparison of logically connected individual notions is, then, the first step in passing from the individual to the general. When several related notions present to consciousness are compared, it seems but a step of simple perception, perhaps through the judgment of identity ($A = A$), to see that an element of A is common also to B and C. Were there, for instance, but three individuals embraced in the extent of any given general notion, and these three could all be present to consciousness at the same time, this simple perception of common characteristics and their synthesis would suffice to give rise to the general notion of these things. But it can easily be seen that any newly perceived object must at once be subsumed under a class, even though it be the class *thing*, or *animate thing*, or *inanimate thing*, or *animal*, or *vegetable*, or *vertebrate*, or *invertebrate*, etc.; so that the vital question is, How do new classes arise? What is the process through which the mind passes in arriving at universals? This is synonymous with the question, What is the nature of *induction?* The subject of induction has been treated at length by many learned men, but it has remained to Dr. William T. Harris to strip the subject of its mistiness, and to present it so clearly and simply that any ordinarily trained mind can comprehend it.[1]

§ **31.** To his explanation we will now address ourselves. Intimately connected with the subject of induction is that of *apperception*, already discussed in a general way in these pages. We have found apperception to be, as a general thing, the subsumption of new subjects under older, wider, and deeper predicates. We shall now find that Dr. Harris explains this process more exactly and from a different standpoint. His fundamental inquiry is, What is the relation of the *syllogism*, as taught in logic, to *apperception* and to the *formation of general notions;* or, in other words, What is the relation of the syllogism to *apperception* and to *induction?*

The syllogism consists of a major and a minor premise and a conclusion. The conclusion has a subject and a predicate, called *terms*. The subject and predicate of the conclusion appear also as terms in the two premises. The subject is symbolized by S, the predicate by P. There is also another term appearing in the premises, which serves to mediate between the subject and predicate of the conclusion, or to bring them together. It is symbolized by the letter M. We have now three symbols of terms which appear in the syllogisms. But these symbols may be differently arranged, and according to the three chief arrangements possible, we have what are called the three figures of the syllogism.

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[1] *Introduction to the Study of Philosophy*, pp. 96–125.

FIRST FIGURE.

(1) M is P: Man is mortal.
(2) *S is M: Socrates is a man.*
(3) Hence, S is P: Hence, Socrates is mortal.

Here the middle term (*M*) is the subject of the first premise and the predicate of the second, and unites the subject and predicate of the conclusion, because it contains the subject (Socrates) and is itself included under the predicate (mortal).

SECOND FIGURE.

(1) S is M: This animal barks.
(2) *P is M: Dogs bark.*
(3) Hence, S is P: Hence, this animal is (probably) a dog.

Here the middle term (*M*) is the predicate in each premise, and unites subject and predicate of the conclusion, because it contains both subject (this animal) and predicate (dog). This figure is *valid*, or invariably true, only in the negative. Thus:—

(1) S is M: This animal climbs trees.
(2) No P is M: No dog climbs trees.
(3) Hence, S is not P: Hence, this animal is not a dog.

As we shall see, however, apperception starts with the second figure, even though not valid, and fortifies itself by means of the first.

THIRD FIGURE.

(1) M is S: All men are animals.
(2) M is P: All men are rational.
(3) Hence (some) S is P: Hence, some animals are rational.

Here the middle term (*M*) is the subject of the premises, and brings the subject and predicate of the conclusion together, because it is contained in them both.

In the case of the apperception of objects perceived through the senses, *perception* precedes apperception; that is, the process begins with *particulars*, or attributes, and hence, if any figure of the syllogism is implied, it must be the second, for in this case the middle term (*M*) is an *attribute*. To illustrate: Suppose I see a moving object in high grass. It looks like a tail curled over a back. The mind would act as follows:—

(1) That is a tail curled over a back.
(2) Dogs curl their tails over their backs.
(3) Hence, this object is (probably) a dog.

or, according to the formula of the second figure,

(1) S is M.
(2) P is M.
(3) Hence, S is P (probably).

Accordingly, the first stage of apperception is taken by means of the second figure. But I wish to be sure, and I now proceed to test the correctness of my conclusion by the first figure of the syllogism, and I think

(1) All dogs have certain characteristics, such as four legs, ears of a general type, a certain general shape of body, etc.

(2) This is presumably a dog.

(3) Hence, I may expect these characteristics, or, according to the formula of the first figure,

(1) M is P.
(2) S is M.
(3) Hence, S is P.

Proceeding further with the identification by means of the second figure, I verify these anticipated characteristics somewhat as follows:—

(1) A lithe, wriggling form appears.
(2) Dogs have such forms.
(3) Hence, this is (more surely) a dog.

Again,

(1) A flopping motion is seen on the head of the animal.
(2) Dogs' ears have such a motion.
(3) Hence, this is (still more surely) a dog.

Again,

(1) I see four sets of twinkling motions in the grass.
(2) Dogs' legs make such motions.
(3) Hence, this is (most certainly) a dog.

The mind thus moves back and forth between the deductions of experience made by means of the first figure, and the verification of these anticipations by the second, until satisfied with the correctness or incorrectness of the first observation.

Should we wish to identify a particular individual, we still further anticipate by means of the first figure, and verify with the second.

Thus, for example, by the first figure,

(1) My dog Don has one black ear, a white body, a slight limp, etc.
(2) This may be Don.
(3) If so, he will have these marks.

Looking further, I rapidly verify these characteristics by means of the second figure, and conclude with a complete, or at least satisfactory identification.

Thus, second figure,

(1) I see a flapping black object on the animal's head, a limping motion, a white color, etc.
(2) My dog Don has such appearances.
(3) Hence, it is Don.

When the process of apperception is analyzed, we find that it begins with a tentative identification of the new object of perception with some well-known object, through the mediation of the second figure of the syllogism; and that further identification is anticipated by the use of the first figure, being then verified or rejected by means of further use of the second figure. Of course, it is not meant here that children, or even adults, consciously use these syllogistic figures, but only that this is the natural movement of the mind in apperception.

We come now to the question, How do general notions arise? or, in other words, What is the process of mind in *induction?*

When the third figure is examined, it is apparent that it can be used only after the first two, for their action is presupposed in both major and minor premise. To say, all men are animals (M is S), is to recognize the subject (animals) in the middle term (all men). But this is the process of identifying, as explained through the second and the first figures. The same is true when we say, all men are rational (M is P). Thus, in the third figure, there are two identifications, both involving the second and the first figures of the syllogism.

The third figure, as we have seen, is,

(1) M is S.
(2) M is P.
(3) Hence, S is P.

To see how this syllogism acts in giving us a new class, let us suppose that we are familiar with the common work-horse only. Now we see a very large dapple-gray animal, which by the other figures we find to be a horse. The following results:—

(1) M is S: This object is a horse.

By a second identification, we have the second premise,

(2) M is P: This object is very large, is dapple-gray, etc.
(3) Hence, some horses are very large dapple-grays (or other colors).

We will call them *Norman horses. We have now from a single observation the basis of a new class.* If no more observations are made, this basis will remain only a potential class, — it will not become actual. But should repeated observation give us new objects which can be identified as belonging with the object first observed, a well-defined class will arise.

An important question now arises. What sort of characteristics shall be chosen for the formation of new classes? Should a number of miscellaneous articles be placed before a child for classification, accidental and non-essential characteristics might be chosen as a basis, rather than more essential ones. Scientific classification always seeks a vital or causal basis, while persons in immature stages of thought are content to classify according to characteristics which appeal most strongly to the senses. We may, therefore, distinguish two bases for new classes: (1) external, obtrusive characteristics; and (2) vital, or necessary (causal), characteristics. In the classification of animals, external marks of color, shape, size, presence or absence of appendages, may be used as the basis; but the naturalist looks deeper and classifies in accordance with characteristics which seem necessary to the existence of the animal; as, e.g., the various organs for obtaining, masticating, and digesting food. For instance, a certain kind of animals, say, ruminants, might be loosely classified according to their horns or their hoofs, but a classification based upon the number and kind of teeth would be subject to far less variation; for the teeth bear a much more intimate relation to the existence of the animal than do either horns or hoofs. The mind approaches scientific classification through many stages of convenient though loose classification, so that it becomes a great problem in education to know at any given stage of the child's mind just what degree of abstraction it is capable of attaining in each study.

It is a useful exercise for the reader to write out a full series of syllogisms relating to experiences of sense perception, beginning identification by means of the second figure, anticipation of further identification by means of the first figure, and concluding with an induction by means of the third figure, the result of the induction serving as major premise of the first figure. The work may proceed somewhat as follows: —

Second figure — Identification:

(1) I hear a whistle.
(2) A quail has such a whistle.
(3) Hence, this is (probably) a quail.

First figure — Anticipation of further identification:

(1) Quails have a brown color, a plump form, make a whirring noise in flight, etc.
(2) This is (presumably) a quail.
(3) Hence, he will have these characteristics.

Approaching, I see and identify the brown color and the plump form; I also hear and identify the whirring noise. All this is done by means of the second figure, as before. The identification continues until I am certain that it was a quail whose whistle I heard.

Third figure — Induction:

(1) This object is a quail.

(2) This object, and like similar ones observed, has a brown color, a plump form, a whirring flight.

(3) Hence (I infer), all quails have a brown color, a plump form, and a whirring flight.

Like all non-mathematical inductions, the conclusion follows, not with absolute certainty, but with a degree of certainty highly probable. It will be noticed that this inductive conclusion is used as the major premise in the first figure of this set of syllogisms.

EXERCISES.

Let the reader write out a set of connected syllogisms in the SECOND, FIRST, and THIRD figures for the following supposed sense experiences.

1. A WHISTLE. Identify the whistling object as

(*a*) A boy, (*b*) a girl, (*c*) a mocking-bird, (*d*) a locomotive, (*e*) a steamboat, (*f*) a factory, (*g*) a referee at a game, (*h*) the wind.

2. A WHITE OBJECT ON THE GRASS. Identify as

(*a*) A patch of snow, (*b*) a newspaper, (*c*) a white cloth, (*d*) a white cat.

3. A WHITE OBJECT SEEN AT NIGHT. Identify as

(*a*) A ghost, (*b*) a cow, (*c*) a mule, (*d*) a sheet on a clothes-line, (*e*) a goat, (*f*) a boy wrapped in a sheet.

4. A NOISE IN THE HOUSE AT NIGHT. Identify as

(*a*) A burglar, (*b*) a loose shutter, (*c*) a slamming door, (*d*) the cat, (*e*) a rat or a mouse, (*f*) a member of the family.

5. Prepare similar exercises upon

(1) A small object seen in the woods, (2) a large animal in a park, (3) a strange animal in the zoölogical gardens, (4) a noise in the street, (5) a person in a crowd, (6) a man in the distance, etc.

NOTE. — The habit of generalizing upon insufficient data is a most common one, and is often indulged in, even by well-educated people, if they happen to make observations in an unfamiliar field. The following incident will illustrate this point. An American professor was traveling in Germany, and being a little late, one summer day, had to run in order to catch his train. This, of course, started the perspiration, and, fearing he might take cold, the professor drew on his overcoat when he reached the car. A German had been an interested observer of the incident, and learning soon after that the professor was an American, he took out his notebook, and wrote as follows: "Americans put on their overcoats when they get warm." The professor, who had begun to chat with the German, noted the action, and suspecting something of its purport, asked the German what he had written. Upon being told, the professor laughed, but made no comment in remonstrance. Soon after, the conductor came along, and being an acquaintance of the German, stopped to chat with him, and finally offered him a cigar. The German replied that he did not smoke, but liked to have something in his mouth, and that consequently he usually held his lead-pencil there. Upon hearing this, the professor drew out his notebook hastily, and made this entry: "Germans do not smoke cigars, they smoke lead-pencils." The German, of course, saw the action, and inquired its purport. Upon seeing the entry, he laughed, and proposed that both of them should revise their generalizations.

§ **32.** As we have seen, the general notion in the restricted sense is symbolized by the *noun*. Nouns are, therefore, in themselves abstract terms. It is easy to understand why the education which was based upon the *word* alone should become meaningless and formal, and we do not wonder that Pestalozzi revolted against it. He insisted that, instead of *presupposing* such an acquaintance with nature, and such an experience in general as would give a meaning to these abstract terms, *the educator should proceed to give the child an experience* of the individual, so far as he does not possess it, and then lead him by his own thinking to the general notion, which is symbolized by the noun, or expressed in definitions, rules, maxims, etc. In this way the word becomes a living force, instead of a dead form. Hence arose the motto, *First the idea, then the word.* This motto, if properly understood, is true and valuable, but may be easily misinterpreted. It is evident that, with little children, for instance, the motto cannot mean that the idea, or general notion as it really is, must be developed in its logical completeness so far as extent and characteristics are concerned. If this were so, the child should never have the word *cat* given to it until it had mastered a zoölogical system; nor could it acquire the word *line* until able to master the metaphysical conception of extension in length, but without breadth or thickness, and until an experience of lines of all sorts, straight, curved, and broken, had enabled it to arrive at a true logical conception of the line.

At first, the word, though itself abstract, is to the child a sign of an individual object; and, hence, at this stage, to give the idea before the word *is to show the individual object.* Later, the word becomes a symbol for some notion not definitely limited in extent and content, which serves as a *type.* This notion is often an indistinct image, only the main characteristics being emphasized; it is well illustrated in composite photography. In this stage, to give the idea before the word would be to develop a logically imperfect general notion from the particulars which may be at hand. In the third stage, the word is a sign of a scientifically complete general notion, as the word *tree* was to Professor Gray, or as the word *line* is to the mathematician. To give the idea before the word here would be to gain the ends of all knowledge before learning the commonest words of childhood. Long before this stage is reached, the word has been learned, and comes to the teacher as one of his greatest aids. Scientifically, to give the idea before the word, means nothing more than to proceed according to the law of apperception; i.e., to see that a predicate, greater in extent and content than the subject, can be applied by the child. If the predicate is only a little broader than the subject, there will be some apprehension of the new idea. The more complete the predicates are, the more complete the apperception will be.

§ **33.** If the present view is correct, *there must be constant progress from the individual to the general at all stages of school life.* There must also be a constant progress in the character of the general, from those primary stages when types more or less individual in character represent the universal, and when accidental characteristics form the basis of classification, up to the complete, scientifically perfect general notion, which is the ripe final product of properly conducted education. *To discover these various stages towards logical completeness in the general notion for all ages of childhood and youth, and in all school studies, would be to solve one of our most important pedagogical problems.* So far as the child is concerned, this would imply a power on the teacher's part to discover at all stages the limit of the child's power to generalize; or, in other words, to unify common characteristics in whatever realm of school study; to make valid generalizations. Too many of our authors talk as if there were a long period of the child's life in which he can do little but observe, when the perceptive powers absorb the whole energy of the mind; and that, consequently, the sole duty of the teacher is to cram the mind with facts, making little or no effort, conscious or unconscious, to enable the child to see the universal which underlies the particular. This is certainly an erroneous and injurious view.

That what has thus far been said is in full accord with the true spirit of the reform inaugurated by Pestalozzi, may be seen from the following quotation: "When I considered the whole of instruction, or, rather, instruction as a whole and in connection with the actual condition of the masses of children who are to be instructed, I could not conceal from myself that the school instruction, as I actually saw it, was wholly unfit for the great public and the lower classes. The feeling began, day by day, to develop in me that it was essentially impossible permanently to remove the great mass of school evils, *unless teachers could arrive at the point when they could subordinate the mechanical form of all instruction to the eternal laws, whereby the human spirit rises from* SENSE PERCEPTIONS TO CLEAR GENERAL CONCEPTIONS (general notions). In those laws I thought surely to find the thread out of which to weave a universal psychological method of instruction.

"(1) Learn, therefore, to arrange thy perceptions, and to complete the simple before proceeding to the complicated.

"(2) Further, bring together in thy mind all those things which essentially belong together, in the same connection in which they are actually found in nature.

"(3) Strengthen and intensify thy impressions of important objects, by bringing them nearer through art, and by making them act upon thee through the different senses.

"(4) Regard all the effects of physical nature as absolutely necessary, and recognize in this necessity the result of the power with which they unify their apparently heterogeneous elements to the realization of their purpose; and let the art with which thou, through instruction, workest upon thy race, as well as the results which it effects, be elevated to a like physical necessity, so that in all of thy doing, all means, however heterogeneous in appearance, work together for the accomplishment of their great purpose."

This, then, is the great merit of Pestalozzi, that whereas the men of his time began instruction with the abstract, with *words* whose *content* was unknown to the children, he began with the individual things, from which alone the abstractions could gain any significance in the minds of the pupils. Instead of presupposing an experience, he supplied one. Instruction is ever swinging between two extremes, *underived generals*, and *ungeneralized particulars.* Undue conservatism tends to the former, and unthinking radicalism to the latter. Pestalozzi struck the golden mean, when he said, *the mind must ever rise from clear individual to distinct general notions.*

SPECIFIC CONSIDERATIONS.

§ **34.** In our analysis of the nature of abstraction, or the passing from individual to general truth, we found that it arises, in general, through the comparison of related individual notions, and a positing, through induction, of the universality of the perceived common characteristics. It will now be helpful to distinguish between mathematical and non-mathematical generalizations, since the two are quite unlike.

§ **35.** Men never cease to dispute about the significance of historical or social or economic facts, so that new generalizations are constantly formulated concerning them; but when once the conditions of a mathematical problem are understood, there can be no further controversy. The generalizations of mathematics appeal to the mind as universally and necessarily true, as soon as they are perceived. In the idea *straightness* is not necessarily involved the idea *shortness*, but the mind has only to think a straight line between two points to perceive that this line measures the shortest distance between them. If it be desired to deduce a rule for multiplying a fraction by an integer, a single problem will suffice as well as a thousand to bring the mind to a knowledge of the law and a belief in its universality. Suppose the illustrative problem to be, multiply $\frac{3}{4}$ by 2. Let two pieces of paper having the same shape and size be taken and folded into fourths. Tear off $\frac{1}{4}$ from each. What now remains of each is $\frac{3}{4}$. If, now, the nature of multiplication is already understood, which must be presupposed, the child will see that 2 times $\frac{3}{4}$, or 2 3's of 4ths, equals the value of the two remaining pieces of paper, or 6 fourths; i.e., the number of parts has been doubled, their size remaining the same, and hence the value of the fraction has been doubled by multiplying the numerator by 2. *In general, multiplying the numerator of a fraction multiplies the value of the fraction, because it multiplies the number of parts, leaving their size the same.* Again, take the two pieces of paper, each containing $\frac{3}{4}$ of the original paper, and arrange the 6 fourths into groups of two each. We find that there are three of them; but two fourths equal one half, hence $\frac{3}{4} \times 2 = \frac{3}{2}$, or this fraction is multiplied by 2 by dividing its denominator by 2, for though the number of parts is the same, their size has been doubled. *In general, dividing the denominator of a fraction* *multiplies the value of the fraction, since it multiplies the size of the parts, leaving their number the same.*

So of any mathematical truth, if it is once brought clearly to consciousness, its universality is at once felt. Is it not a sin that pupils should be taught arithmetic for years, without ever having been made conscious of the necessary validity of the rules and principles they constantly use? Daily experience shows that pupils may finish arithmetic in the high school without having grasped the true meaning of even so simple a process as subtraction. Thus, if a pupil holds 8 sticks in one hand and 3 in the other, he will usually stand in confusion, if asked to show with the objects how many more there are in one hand than in the other. It is not necessary to wait until the pupil can perform algebraic and geometric demonstrations of general mathematical truths before giving him any insight into them; but this should be done through the presentation of one or more individual illustrations, when there is first need of using the generalization.

§ 36. Next to mathematical general conceptions come those having to do with external nature. With mathematics all is exact and limited; with nature, on the contrary, inexactness and uncertain extension prevail. The notion *triangle* may easily be defined with exactness; not so the notion *horse*. But here as everywhere, we must begin with the known individual. In natural history, individual objects must be carefully compared, their likenesses and differences noted, the accidental distinguished from the apparently essential, in order that the general notions may gain as much clearness and universality as the age and ability of the pupils permit. So in geography a child's conception of a mountain, a river, a lake, an ocean, should be based upon what he has seen, first in nature about him, and then in pictorial representations. In physics, experiment should lead to the development of physical laws. Here we have, as in mathematics, an *a priori* element; i.e., the necessary belief of the mind in the uniformity of causation. Like causes always produce like effects, provided the conditions do not vary. If, therefore, the principle of the siphon is grasped in an individual case, it will be understood in any other like case.

§ **37.** To develop true general notions concerning political or social or ethical affairs is far more difficult than to do so in the realms of mathematics and the physical universe; first, because the senses cannot be appealed to, and, second, because of the infinitely more complex and entangling conditions. Compare such notions as *state, nationality, society, justice, legal right, moral good,* with those of *triangle, division of a fraction, mountain, lever.* The complexity of the former is in sharp contrast to the relative simplicity of the latter. Instruction must, however, return as ever to the individual embodiments of these ideas; for it is the universal law of all correct instruction that the general must be preceded by the particular, for there is no other way in which it can be understood. By this statement is not meant that pedagogical device is limited to one procedure. It may be that a mind can best be aroused by having some startling generalization hurled at it, which, however, can only be understood through much particularization. Many good text-books introduce a topic by stating some broad general truth or law concerning it, but no good text-book assumes that the statement of a wide-reaching law is sufficient to explain and establish it. For example, Avery's "Elements of Natural Philosophy" begins almost every topic with a definition, which is the expression of a general notion. Thus, at the head of the chapter on machines is this: "WHAT IS A MACHINE? *A machine is a contrivance by means of which the power can be applied to the resistance more advantageously.*" Then follows a discussion of what is contained in this definition.

It matters not, therefore, whether one's general course is inductive or deductive; this will depend largely upon the subject, and the mental maturity of those who are to pursue it. But one thing is sure, there will never be any clear grasping of the significance of a general conception, until it has been tested at least, by individuals which are ranged under it.

For the reason, then, that we first grasp the general through the particular, all ethical instruction should proceed from individual cases of action involving a moral content. Hence, it does not suffice to preach in school, except from the text of an actual event. Children can best get the first points of crystallization for moral truths from stories involving a moral content. Here the emotions are not unduly aroused, as they are likely to be where the action is one that touches them personally, so that the irrational nature of wrong action appeals to the understanding as well as to feeling. History fulfills its noblest mission to the race on account of its ethical content and of the individual nature of the presentation. Every deed of heroism, of benevolence, of charity, of patriotism, is a concrete embodiment of a precious virtue; while every mean, cowardly, dastardly act is an individual protest against meanness, cowardice, or villainy. We can only continue the deposit about these starting points, until at last the soul is strong in itself to stand against temptation.

§ **38.** Most difficult of all is the formation of true general conceptions in the realm of æsthetic and religious truth. Here, again, we can but lay the beginnings of correct ideas, and, as before, only by starting with individual illustrations. Call attention to the beauty in the flower, the tree, the bird, the landscape, the heavens. Awaken the first love of the beautiful in art by contrasting grace and beauty with ungainliness and ugliness. Teach reverence for age, for authority, for law, for the name of God. Awaken the feelings of love and thankfulness, in return for love and benefits.

CHAPTER V.

THE RETURN FROM GENERAL TO INDIVIDUAL NOTIONS.

§ **39.** We have thus far considered two grand stages of rational methodology; viz., the apperception, or assimilation of individual notions (preparation and presentation), and the transition from individual to general notions. One more equally important stage remains. This is the return from general to individual notions, or the application of derived universals to new particulars. Says Lange (*Ueber Apperception*, p. 129), "We have fallen from one extreme to the other: whereas, formerly a hard and lifeless instruction laid the chief emphasis upon the memorizing of the text, it is the custom of our times largely to neglect the *application* of that which is learned; consequently, the ever-repeated complaint, that though our youth indeed know a great deal, they can *do* but little, that they possess indeed knowledge, but little capacity and readiness to act, and that upon leaving school, the knowledge largely disappears. Where drill and application are lacking, where a line of thought is developed, but in complete isolation from related thought, the capacity of applying this knowledge to its natural and appropriate field is soon lost, no matter how clear the original thought may have been." Pestalozzi goes even so far as to say ("How Gertrude," etc., XII.), "It is perhaps the most frightful gift which an evil genius makes to his age: knowledge without capacity to do."

Why this stage of right method is so necessary and what are its essential features, will appear in the following sections.

§ **40.** Kant stated a profound and many-sided truth when he said that notions without perceptions are blind, that they are mere empty forms. The man whose whole knowledge consists of abstractions has indeed a barren mind. He is able to deal in nothing but glittering generalities, so that his thinking pertains but slightly to the practical affairs of the world, in which alone man's destiny can be wrought out. Nor should we imagine that such thought marks more than an elementary stage of mind. Philology shows that language did not begin with the concrete and gradually extend to the abstract, but that it began with the vague, the general, the indefinite; as, with the *verb*, which represents no *thing*, but an action or a state, and with the *pronoun* as a verb-suffix, not indeed to represent a noun, but to manifest a relation between the speaker and the object of thought.

There must be a rich content of knowledge, as well as the generalizations derived from a few particulars. This can be obtained only by long and persistent application of abstractions — a rule in arithmetic or grammar, for instance — to appropriate fields of new particulars. It will not suffice to limit the study of differentiation to the individual notions from which the general was derived. Should a botanist know only the *common* characteristics of trees, the sight of a given tree could arouse no such wealth of conception as is supposed in the case quoted from Dr. Harris. Should he know only the individual characteristics of one tree, his experience of trees would still be meager and barren. If, then, knowledge is to have a full, rich content, as well as universality, the general truth gained must be perpetually enriched and re-enforced by application to new particulars.

§ **41.** There is need of a wide and persistent application of general truths, in order that they may become a permanent acquisition to the child. A principle in arithmetic, for example, even though fairly grasped by the pupil, will soon fade from his mind if extended application has not impressed it there. The need of doing this has usually been better recognized in arithmetic than in any other department of common school study. The fault of thoughtless teaching in this branch has heretofore been, not so much a lack of application, as failure to teach the pupils *to see the universality of the rules and principles which they were using.* The fact that the pupils are commonly drilled for a long time in the application of arithmetical rules, accounts in some measure for the lasting interest which teachers are able to awaken in this subject.

That pupils remember these rules well is, therefore, not surprising, for in this branch they are better drilled in the application of principles than in any other. If this efficient drill upon new problems could be preceded by a derivation of general principles from particular cases, our instruction in this branch would be ideally correct. Furthermore, not only do pupils soon forget an unapplied generalization, but they can make it truly serviceable only by constant use. Practice makes perfect.

§ **42.** It is needful to practice a wide application of general truths, on account of the bearing of such practice upon all the affairs of life. The mind must be trained to distinguish the essential from the non-essential, the valid from the accidental or false, at all times and under all circumstances. Man is constantly required to decide important questions which are complicated by details. The judge upon the bench must see the truth through a mass of conflicting testimony; the counsel before the bar must detect the weak points in his opponent's case, however covered by misleading evidence or argument; the teacher must be able to see the most effective means of governing his school, or discover the straightest path to the pupil's understanding; the voter should be able to judge intelligently of the probable effect of any proposed political measure, however confusing and contradictory the arguments of politicians may be; the merchant, the manufacturer, and especially the speculator, needs the ability to weigh calmly the great factors, supply and demand, and competition, in the face of confusing but non-determining conditions. So in all departments of life, social, political, economical, the successful man, be he farmer or warrior, merchant or teacher, is the one whose training enables him under all circumstances to recognize the important and enduring, however much they may be complicated with the accidental and non-essential. Such insight is not gained by the learning of individual facts, or by the memorizing of universal truths, but only by a constant, efficient application to a wide field of particulars, of general laws which have been consciously derived from individual cases.

§ **43.** Again, this perpetual return from the general to the particular is the most effective means for the co-ordination of knowledge. It is too much the tendency of the schools to impart knowledge in parallel lines having little or no vital connection. For example, the studies whose common end is knowledge of the mother-tongue, such as reading, writing, spelling, composition, punctuation, grammar, rhetoric, are usually taught as separate and unrelated branches of learning. When related studies are taught in this way, there must necessarily be great waste in the labor of learning, and great deficiency in the ready use of what is learned. To a greater or less degree, all knowledge is related, all wisdom has a bearing upon every great enterprise of life. To bring the mind to the consciousness of this unity of knowledge is one of the great functions of the school. The world is not so much surprised as grieved, however, when moral maxims appear to have little bearing on conduct, when the forms of religion lack the content of daily right living, when book-crammed brains cannot reduce their memorized theories to concrete practice. The most effective means for this desirable co-ordination of the knowledge at the pupil's command, aside from radical changes in the manner of presenting studies, is the thorough-going application of those generalizations at which the pupil has arrived, to all fields of particulars lying within his compass of thought.

§ **44.** With the foregoing exposition of the necessary stages of all right methods in mind, it is not difficult to discover where the prevailing treatment of various school studies has departed from correct pedagogical practice. The trinity of instruction embraces: (1) the apperception or assimilation of individual notions; (2) the transition from the individual to the general (classes, rules, principles, maxims, etc.); (3) the return from the general notion to new fields of particulars. As we have seen, the fault in arithmetical instruction has been, not a lack of application, but a failure consciously to take the second step; viz., to make the transition from given individual numerical relations to a clear apprehension of the general principles involved. For example, though a general rule is given for division, pupils are rarely led even once to perceive clearly what is involved in such problems as the following: divide 10 apples equally among 5 boys; and, having 10 apples, to how many boys can I give 2 apples each? In grammar, however, all of the vital points in instruction have been ignored to a greater or less degree. There has been, in our modern standard grammars, very little attempt to grasp vividly even individual facts of language, almost no attempt to develop general principles from individual illustrations, and but meager and formal application of general laws to new particulars. Each subject is usually introduced by an underived definition, which is illustrated by a single sentence, and applied to a few disjointed, often meaningless, sentences. Thus, for illustration, we find such treatment as the following: "Verbs are divided, according to their *use,* into *transitive* and *intransitive.* A *transitive* verb receives or requires an object to complete its meaning. *Example.* — The servant opened the *door.* What walls can guard *me,* or what shades can hide [me]? — *Pope.* An *intransitive* verb neither receives nor requires an object to complete its meaning. *Example.* — The sun *rises.* The horse *runs.*" We have for application such sentences as the following: Anna loves her mother, The golden gates open, The moon silvers the distant hills, Mary has found her ring, Eleanor writes poetry, The snow melts, etc.

What wonder that countless children have thought grammar "dry," when they have begun with abstractions whose full meaning they were never taught to see, and whose application, of the most formal kind, was to meager amounts of matter possessing often neither coherency nor inherent value?

We have been trying to discover what the essential elements of a good method are. If one or more of these elements are ignored or slighted, the method is pedagogically unsound, and its results will be unsatisfactory, whether the fault be in the text-book, or in the teacher, or in both. But if the essentials of right methods are observed, there may be almost infinite variety of device in teaching and reciting the lesson, without vitiating the results. This is the true scope for the individuality of the teacher and the text-book, but neither teacher nor book can ignore the essential forms of true methods without encountering partial or total failure.

Until recently, formalism governed our teaching of grammar. The recitation of rules which had lost, or perhaps never had, content; the endless repetition of forms valueless for thought; and the ceaseless and formal iteration of the properties of the parts of speech in parsing, long after the last ripple of thought or interest had faded away,—led finally to a revolt which is almost as irrational as that from which it would fly. In a vast number of schools, grammar proper has disappeared, and in its place has come the "language lesson." This consists chiefly in practice upon the art of composing, and is usually accompanied with some formal instruction upon such grammatical forms as appear in writing. This is well enough in the elementary grades, but it is not grammar; it opens the mind to none of the great lines of thought to which grammar is the gateway,—logic, rhetoric, psychology, philosophy.

In geography and history the case is not greatly different. Text-books in geography often begin with abstract definitions, of which the child can have little or no apprehension. Thus, "The earth is the planet on which we live." Even with the simpler notions, such as *mountain, river, plain, lake, island, cape,* little effort is made to enable the child to arrive at proper conceptions, or even to obtain any conceptions at all. But perhaps the most serious fault of the current methods of teaching geography is, that the child is not taught to look within and beyond the individual facts he learns. The subject remains in its individualized stage. There is no passing from individual to general notions, no application of geographical principles to new particulars. For this reason, no geographical fact appears to have more than a momentary and accidental relation to any other. Under such treatment, geography becomes a chaos of unrelated facts, having no progress, no development, no rational unification, no end. Facts are learned only to be forgotten, or to lie in the soul isolated and devoid of significance. Ritter and Guyot never subject geography to such irrational treatment, but then their books are not popular. They demand some thought on the part of the teacher, and thought is the last thing which the inexperienced or untrained teacher is able or willing to give.

History, like geography, records a wilderness of facts. If our analysis of the essentials of right methods is correct, these facts should be grouped, not only so that they may be remembered, but so that the lessons they should teach may appear in the consciousness of the learner. This is true not alone of the ethical lessons with which history always abounds, but also of the immediate ends for which men struggle. When the objective point for which a war, a campaign, or a battle is conducted is once understood, it becomes a beacon-light by which the meaning of every movement may be examined. Historical facts are then vitally related and easily remembered. But to require an unthinking memorizing of facts, to impart a knowledge whose rational connection and significance depends upon accident, and whose application never appears, is to pursue a method as unpedagogical as it is easy.

CHAPTER VI.

ADDITIONAL CONSIDERATIONS.

METHOD-WHOLES.

§ **45.** A METHOD of teaching which deals solely or chiefly with individual facts, without regard to their logical interdependence and content, would naturally need to take no thought about the most efficient subdivision of the matter to be learned, since one halting-place would be as good as another. Thus, a certain number of words in spelling, a given number of places in a map-lesson in geography, a convenient number of pages in history would constitute the lesson. Only considerations of the time at disposal and the age of the pupils would determine these purely arbitrary subdivisions. With a rational view of the function of instruction and the necessary form of right methods, quite another principle of subdivision must be observed. In accordance with this idea, *individual facts must be made to yield their rational content in the form of definitions, rules, principles, maxims, etc. which must in turn have a wide application to the whole field of new individual facts to which they are appropriate. It is evident, therefore, that there must be a subdivision of the matter of instruction for every important general notion which is to be derived and applied.* Thus, each important definition or rule of mathematics or grammar should be treated by itself in derivation or development from individual facts, and in its appropriate application. Here the proper subdivision is almost a matter of course, but it is more difficult in the departments of history, geography, and natural history, where apparent progress is possible without any reflection whatever. In mathematics and grammar a separate division or method-whole can usually be treated every day; but in the other departments named, a method-whole will frequently occupy the time of the class for several days. For example, Grant's Chattanooga Campaign may well be treated as a whole, as the working out of a single conception, yet it would ordinarily need more than a single recitation to complete the subject. In mathematical and physical geography, the subdivisions are as plainly marked as in mathematics and grammar; but political geography is in special danger of aimless and useless subdivision. Each group of political facts should be viewed as the manifestation of some idea, the result of some cause, social, physical, or economical; for example, the rise of great cities, the development of manufacturing industries, the distribution of population, the prevalence of staple crops, the growth of facilities for transportation. If a section of country is to be studied, its rivers, mountains, towns, lines of communications, inhabitants, furnish topics for the individual facts; a drawing of the whole brings the manifold into a unity; while drawings from memory, the location of important points, imaginary journeys from place to place, descriptions of people, employments, etc., furnish ample application. The younger the children are, the smaller must the subdivisions be. Only one caution needs to be given. Care must be taken not to atomize the instruction. The presupposition of brains on the part of the children must always be made, for they come to a thousand conclusions and take a thousand steps in thinking, which the teacher need not painfully point out. The teacher is needed for those steps which the children cannot take alone, the derivations and applications which they would not or could not make; consequently, instruction should deliberately plan for these greater matters of education, leaving the smaller ones to an awakened spontaneity of the pupil, or to incidental instruction. With these general remarks on the subdivision of the matter of instruction into method-wholes, the subject may be deferred until the practical illustrations are reached.

RELATION OF SO-CALLED "METHODS" TO THE ESSENTIAL FORMS.

§ **46.** That the relation of the essential forms of instruction, as exhibited in this volume, to what are usually known as "methods" of teaching may clearly appear, a brief analysis of the latter will now be given. Methods of imparting knowledge may be considered from three standpoints: (1) the learner, (2) the matter taught, and (3) the teacher.

1. **Methods with regard to the learner.** — Nothing can be learned, except as it is apprehended under the forms of thought; of these, logic exhibits three: (1) the notion, (2) the judgment, (3) the syllogism. Knowledge can therefore be imparted in the form of *explication*, *predication*, or *demonstration*.

(*a*) *The forms of explication.* — Notions, as the synthesized characteristics of things, form the elements of thought and, hence, of knowledge. The notion of a thing is acquired in two ways; (1) by observation, and (2) by words. The first gives the *objective*, or observation; the second, the *defining* method. Observation evidently has to do with the first formal stage of instruction; viz., the apprehension of the individual notion. Definition is the summary of the second stage; viz., the transition to the general notion.

(*b*) *The form of predication.* — When two or more notions are brought into relation through the copula, we have the expression of the judgment, or a predication. When predication is made without regard to progress in time, we have the *descriptive* method: this pertains to the first stage of instruction, in which new facts are learned. When the predication pertains to that which is *becoming*, or progressing in time, we have the *genetic* form of instruction: this may in turn be progressive or regressive, according as the predication takes the direction of the development or the reverse. History, for instance, may be regarded as a development in time, in which the events of one period appear as the cause of those of later periods. Like the descriptive predication, the genetic belongs to the first stage of instruction, — the imparting of information.

(*c*) *The form of demonstration.* — If two or more judgments are so related that a new judgment follows, the syllogism arises. A demonstration must proceed from a universal to a particular, or the reverse. The first gives the *deductive* proof; the second, the *inductive.* Induction answers especially to the second grand stage of instruction, for it is the business of induction to derive a universal truth from given particulars. Deduction corresponds most closely to the stage of application, or the return from universals to new particulars.

2. **Methods with regard to the thing learned.** — An object of knowledge is analogous to the notion with its characteristics: it consists of a whole and its parts. One may begin with the whole and proceed to its parts, or one may begin with the parts and proceed to the whole. Thus, in geography, the earth itself, or the geographical facts in

the neighborhood, may be the starting-point. The method which begins with the whole and proceeds to the parts is *analytical;* that which begins with separate facts and works toward the total is *synthetical.* The essential forms of right methods may be observed with either of these processes; e.g., it is indifferent, so far as observation of the essentials of right methods is concerned, whether grammar is begun with the *sentence* or with the *word*, whether grammar is taught analytically or synthetically. It goes without saying, that these two methods of treating a subject may be combined.

3. **Methods with regard to the teacher.** — Aside from the first two considerations, the communication of knowledge is realized (1) through the *monologue* on the part of the teacher, or (2) through the *dialogue*, in which the *question* is an important factor. The monologue is important in imparting information, in the first stage; and the dialogue (catechetical, Socratic, developing method), in *preparation* for apperception, in developing the universal from the particular, and in applying it to other particulars.[1]

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[1] Compare Vogel, *Encyclopedæ der Pädagogik*, pp. 67-70.

PART III.

PRACTICAL ILLUSTRATIONS.

CHAPTER VII.

§ 47. THAT the young teacher may have a few illustrations of the practical workings of the ideas presented in this volume, the following working models are offered. All that is claimed for them is, conformity to the essential stages of a correct method; viz., a conscious effort to observe: (1) the apperception of new facts, in *preparation* and *presentation*; (2) the transition from individual to general notions, whether the latter appear as definitions, rules, principles, or moral maxims; and (3) the application of these general truths to concrete facts, i.e., the return from universals to particulars. The illustrations cover all the studies of the common school curriculum, and often several grades of work in each. For many of the illustrations the author is more or less indebted to others, notably to Professor W. Rein, of the university of Jena, and to Dr. O. Frick, director of the *Franckeschen Stiftungen*, in Halle.

LANGUAGE.

§ 48. *Oral language-lesson for the first grade.*

SUBJECT-MATTER.—THE WREN AND THE BEAR.

I.

(*a*) One summer's day, a bear and a wolf took a walk in the woods together. The bear heard a beautiful song from a bird, and said, "Brother Wolf, what kind of a bird is it that sings so finely?" — "That is the king of birds," said the wolf, "and before him we must bow." It was the wren, which is called the king of the hedge. Then said the bear, "If that is so, I should like to see his kingly palace; come, show me the way to it." — "That won't do," said the wolf: "you must wait until the queen comes."

(*b*) Soon the king and queen came, bringing food in their bills to feed their children, the little wrens. The bear wanted to follow them at once, but the wolf held him back by the sleeve, and said, "You must wait until the king and queen are gone." Then the bear and the wolf noticed the hole where the nest was, and went off.

(*c*) But the bear could not rest until he had seen the palace, and after a short time went back to the nest and looked in. The king and the queen had flown away. He looked into the nest, but saw nothing except five or six young birds. "Is that the kingly palace?" cried the bear. "That is a pretty palace! You are no king's children, you are nothing but common children." But when the young birds heard this, they were very angry, and cried out, "No, we are not common children, our father is king, and our mother is queen. You shall be sorry for what you have said, Mr. Bear!"

(*d*) The bear and the wolf began to be afraid, and hurried back to their dens. The young birds screamed and scolded until their parents came again, bringing them more food. Then they said, "Even if we have to starve, we will not touch so much as a fly's leg until you have shown the bear that we are not common children. He has been here and has insulted us."

(*e*) Then said the old king, "Don't worry, I will soon settle that matter." Then he and the queen flew to the bear's den, and shouted into the hole, "You old growling bear, why have you abused my children? You shall be sorry for that, for I declare war against you." Then the war was declared, and the bear called together all four-footed animals to aid him, — the ox, the donkey, the deer, the wolf, and all others to be found in the world. The king called together all the animals which fly in the air; not only all the birds, big and little, but all flies and gnats and bees and hornets.

II.

(*a*) When the war was about to begin, the king sent out his spies to find out who the general of the army was. The gnat, who was the slyest of all, flew into the woods where the bear and his friends were gathered, and lit on the under side of a leaf of the tree under which the matter was to be settled. The bear stood up, called out the fox, and said, "Fox, you are the most cunning of all animals, you shall be our general and lead us."—"All right," said the fox, "but what sort of signs shall we agree upon?" Nobody knew. Finally the fox said, "I have a fine, long, bushy tail; it looks like a fine red plume of feathers. When I hold it up, then everything is well, and you must march forward; but if I let it hang down, then run for your lives." When the gnat heard this, she fled at once to the king, and told him all about it.

(*b*) At daybreak, when the battle was to begin, the four-footed animals rushed to the place with such fury that the earth trembled. The king came also with his army, through the air. They whizzed and screamed and buzzed until it was dreadful to hear them. But the king sent for the hornet and told him to fly down, settle on the under side of the fox's tail, and sting with all his might. When the fox got the first sting he could not help jumping, but he bore the pain, and kept his tail up. At the second sting he had to let his tail drop for an instant; at the third sting he could stand it no longer, but dropped his tail between his legs and screamed with pain. When the animals saw this, they thought everything was lost, and began to run, every one to his den. The birds had won the battle.

III.

Then the king and queen flew back to their children, and cried, "Children, be happy, eat and drink, for we have won the victory." But the young ones said, "We will not yet eat. The bear must first come before the nest and beg pardon, and say that we are kingly children." Then the king flew to the bear's den, and said, "You old, growling bear, you must go to my nest and ask pardon, and say that my children are kingly children, or you will have every rib in your body broken." The bear crept to the nest in fear, and begged for pardon. The young birds were now satisfied. They came together, ate and drank, and had a jolly time till late into the night.

TREATMENT.

The entire story is considered a method-whole, but is subdivided for convenience of preparation and presentation, and of repetition by the children.

(*A*)[1] STAGE OF APPERCEPTION.

I.

(1) Preparation for Section I. — We have learned about the wolf and the seven kids, also about the wolf and the fox. Perhaps you have seen a bear? (Dancing bear, picture.) The wren, or the king of the hedge, is one of the smallest of birds. A king lives in a castle. (Pictures.) What is the castle of the hedge king? Who obeys him? (Animals.) Are they always peaceful? What do they do sometimes? Who has seen this? (Fights between dogs, between cat and dog, etc.) Leaders, parties, war, victory.

(2) Presentation. — Teacher tells the story in sections to "bees and hornets," pausing at the end of each subdivision, *a*, *b*, *c*, *d*, and *e*, to have the story repeated by the children.

II.

(1) Preparation for Section II. — Now, there were two armies who were going to have a battle. What animals were on one side? What on the other? What kind of weapons did they have? Was each animal allowed to do whatever he wanted to? Who gave the orders for one side? For the other? General, scout, battle. Which side do you think will win?

(2) Presentation. — Story in sections *a* and *b*, to "the birds had won the battle." Children repeat as before.

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[1] To avoid needless repetition, let it be understood that the capital letter *A* stands for the stage of apperception; *B*, for the transition from the individual to the general notion; and *C*, for the stage of application, or the return from general notions (definitions, rules, principles, maxims, etc.) to new individual notions.

III.

(1) **Preparation for Section III.** — The bear had lost the battle. Do you suppose the young birds were entirely satisfied? Why not? What ought the bear to do yet?

(2) **Presentation.** — Story to the end, with repetition of the various sections until all the children can repeat the whole story in good language. This will require several recitations of twenty minutes each.

(B)[1] STAGE OF ELABORATION.

Transition from particulars to generals.

(3) Derivation of *notional* content. (In this case moral maxims.)

The bear was very curious. He wanted to see what he supposed would be the castle of the king's children. But he judged according to appearances. Do appearances ever deceive? (Instances by the children.) Did he speak properly to the young birds, even if they had been what the bear supposed? He insulted them. Was that right? What did the fox call the wolf? (See Grimm's story of "The Fox and the Wolf.") A glutton. Was this an insult? Should children call names? Did the young birds put up with everything? What did they do?

FORMULATION OF MAXIMS. — (1) *Do not judge according to appearances.* (2) *Insult no one.* (3) *Guard your good name.* (4) *Do not be overcurious.*

(C)[1] STAGE OF APPLICATION.

(4) **Application** — Examples of children who are too curious. If any one is poorly clothed, what may one not say at once? Should he be insulted? If any one insults you, how shall you act? Examples.

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[1] See note at foot of page 83.

§ 49. *Oral language-lesson for the second or third grade:*

THE SHIPWRECK.

Adapted from "Robinson Crusoe."

They had sailed several weeks, and Robinson had long since forgotten his intention to return home. Suddenly there arose a second storm, much more fearful than the first. The ship was tossed about on the sea like a nutshell, and the waves broke over the deck every minute. Then Robinson became dreadfully frightened, and thought every instant to find his death in the waves.

The storm lasted for several hours. All at once Robinson felt a powerful shock. The ship had struck upon the rocks. At that instant the sailors cried out, "The ship has sprung a leak!"

The water rushed into the ship. Everybody cried for help. Each thought only of saving his own life. A boat was lowered into the sea at once, and all sprang in. They had not gone far from the ship, when a mighty wave upset the boat and swallowed up all the men.

Robinson was also thrown into the sea by the wave, but he succeeded in rising to the surface for an instant; in the next he was again under water. Soon a wave lifted him up again, and he was able to keep his head and breast out of the water for a short time. He noticed that he was not far from land. Scarcely had he spied the shore when a wave dashed him so violently against a rock that he believed his last moment had arrived. But he had presence of mind enough to cling to the rock with his arms. This saved him, for, soon a returning wave dashed over him, and would have carried him away, had he not held fast. Now he clambered up the shore, but his strength was so far gone that he fainted.

For a time he lay unconscious. As he opened his eyes, his first words were, "Where am I?" He looked about for the men who had been with him in the boat, but nothing was to be seen of them. They were drowned in the sea, and he alone had remained alive. He fell upon his knees and thanked God for his rescue.

TREATMENT.

(*Elaborate outline by a student of Illinois State Normal University.*)

Determine what subdivisions, if any, are needed. — This section might be subdivided into two parts, the first being a description of the shipwreck as a whole (. . . "and swallowed up all the men"), the second relating the individual event concerning Robinson's wonderful rescue (. . . "thanked God for his rescue").

The idea to be developed out of the first part would be the fearfulness of a storm at sea; that of the second, the necessity of keeping his presence of mind in danger. But as it is a second storm, it may be supposed that something about such a calamity has been said in the first section; moreover, the two ideas to be brought out are so nearly related that the entire section can be taken as *one method-whole.*

(A.)

(1) **Preparation.** — *Teacher:* We have had many stories that tell us about life on the land or the continent; this time we may see, therefore, how things look on water, and what may happen when we are there. — Who has ever seen a large river or a lake? Have you ever been in a ship there? Yes; Mississippi, Lake Michigan, etc. How is a boat moved? Oars, sails, steam. Teacher mentions that the use of steam was not known in former times. Is a voyage on water pleasant, or not? O, yes. But rivers and lakes are not all the water we have. Who knows whither the Mississippi is flowing? The St. Lawrence? Any river? Why does the sea not overflow? Nobody. *Teacher:* This seems strange, and I myself studied about that when a boy; finally I found it out, and I'll tell you about it at some other time, if nobody anticipates me. Do you believe there are any ships on the sea? How many? Pupils laughing. Do you think they are as large as those on rivers or lakes? Who has ever seen one? Teacher presents a picture of an ocean steamer and of a large sail vessel. Did you ever hear of Europe? O, yes; son of an immigrant. How do immigrants come from there, or how

would you get there? Why? Do you know how the Chinamen come to this country? The sea they have to cross is even much larger than that between America and Europe. Do you suppose you could see the shore at any time when at sea? Could the voyage be made in a shorter or longer time before the use of steam-power? What power only was then used to move these large vessels?

You told me a while ago that traveling on water is very pleasant. Can you think of a case where it would not be so? Wind, sweeping away whole towns. What effect will it have upon the water? Upon the ship? Tossing. How if the shore or some shallow place were near? What of the ship and the passengers? Do you think such a case may be foreseen? Can the storm be avoided? Can any preparation be made to avoid danger? Did you ever see a small boat hung on the side of a large vessel? What for? *Ans.*—I thought it was for fishing or bathing. Not quite; they are *safety-boats*; a large sea vessel has several of them, perhaps a dozen.

Would you now have courage enough to sail in such a vessel for a far country? A sailor's boy, who could not keep his seat quietly, "I should, I should!" You, boys? "O, yes." You, girls? (Doubts.)

(2) **Presentation.**—(*a*) Relate the story, being careful in the text. Stop at the point where the individual story begins. Let the pupils repeat thus far; correct false conceptions. Second part in the same way.

(*b*) Do not interrupt the pupil at every moment; let him have "his talk," and see what his conception of the matter is.

(*c*) Use correct and logical language, *in repetition as well as the first time*, or the pupils will correct you.

(*d*) Let the whole section be related, finally the whole story.

(B.)

(3) **Ask questions which will bring out the general truth you wish to teach.**—Had this ship any provisions for the saving of life in time of danger? How do you know it? A safety-boat was lowered. How do you think the passengers felt in that

dreadful moment? Anguish. Do you suppose this passage from the sinking ship into the boat took place in good order? No, disorder. Why? Everybody cried for help, thought only of saving his *own* life. Upon what, then, can you not always rely in such a calamity? Upon the help of others. Upon whom, therefore, would you have to rely? In my own powers. Would *you* not think at all to help others? (Indecision.) *Teacher:* There are examples of persons who have done so, and it would be well for you to imitate them, so far as you can. Yet nobody will reproach you when you think of saving yourself, too.

Could Robinson do anything for the men in the boat when this was upset by the wave? No. Why? No possibility; all swallowed up. How would you call a man that thinks only about his own safety, though he could also do something for others? Selfish. Was Robinson selfish?

Let us see quite clearly how Robinson came to save his life when all others were swallowed up. What did he do when the wave brought him up again? Raised head, spied the shore. Would all persons in such a moment recognize what was before them? Why not? Did Robinson recognize the shore? Yes, he *noticed* it. Was he not in anguish at all? Yes; but not so far as to be wholly overcome by it. Now let's see what further happened. Again a wave dashed over him and swept him away. Where did he find himself next? Rock. What did he do? What was the consequence of this? Saved him. If he had not done that, what would have happened? Why would he not have been able to do anything towards saving his life, even when he *had* one more opportunity? Fainting. Which moment was this one, then? The *last* and *decisive*. How did he use it? Very well. How *could* he do so? He was not overpowered by fear or anguish. That's true; we may say he could still make use of what? Of "his senses." Even more than that. That he stretched out his arms just in the right moment was not chiefly an act of his body, but rather of his *mind*. What is therefore said of him in the story? *He had presence of mind.*

FORMULATION OF MAXIM. — *One should always keep his presence of mind in time of danger.*

(C.)

(4) **Ask questions showing the application of this general truth.** — Do you know of any case where you could act like Robinson? (Pause.) You are perhaps thinking about a similar case at sea, but you do not need to go so far; there are accidents which may happen to you at any time. Suppose you fell into a creek, one or two feet deep, would you lie there and continually cry for help, or would you try to get out by yourself? (Answer.) But we have seen that you should also help others who are in danger. What would you do if your little sister should happen to fall into that creek near your house? *Ans.* — Spring in and save her. Why not run home and call somebody else? Might be too late. In which case would you show presence of mind?

To-morrow we shall review this wonderful story, and I shall see who can give me more such cases in which you *would* show what you have learned from brave Robinson.

But there is one point left; who knows? Robinson thanking God for his rescue. Why did he do this? He did not think the rescue was *only* his own work. Truly, his own efforts had been blessed by help from God. A proverb (?) says: "Help yourself, and *God* will help you." Did he do well in thanking God for his salvation? *All:* Certainly. Should you also be thankful for his help as Robinson was? *All:* O, yes; we learned that long, long ago. Very well; and how you can do this, mamma will tell you more at length than we can do here.

§ 50. *Oral language-lesson for third or fourth grade.*

PARIS AND HELEN.

There was once a sea-god named Nereus, who lived upon the bottom of the sea, in a splendid grotto, with his fifty daughters, the *nereids*. The nereids were friendly to men, and whenever a ship was in danger from storm, they were glad to help the troubled sailors. They were all very beautiful, and one of them, Thetis, especially so. Even the gods of the sky loved them. Now, there was a young prince of Thessaly, named Peleus, who was also a favorite of the gods. To him the gods gave the beautiful Thetis as his wife. The marriage was celebrated upon Mount Pelion. All the gods and the goddesses were invited to the wedding, except the goddess of Discord, Eris Because she was not invited, Eris wanted revenge; so when the joyousness was greatest, she appeared suddenly with a golden apple in her hand, which she threw among the guests, crying, "For the most beautiful." Then she disappeared. A strife now arose among the goddesses, Juno, Minerva, and Venus, each of whom wished to be thought the most beautiful. They were all indeed very beautiful, much more so than any mortal. Juno was the wife of Jupiter, the highest of the gods, and was as beautiful as could be imagined; whoever saw her, was filled with reverence, and scarcely dared to look up at her. Minerva was beautiful like the daughter of a hero; courage and wisdom glanced from her lovely eyes. Venus was wonderfully lovely, and one could never tire of beholding her beauty. Since no one of them would give up to the others, they decided to select a mortal as judge. But Eris had now her desire, for since strife had arisen, all pleasure was at an end, and the wedding guests departed.

In Asia in a deep woody vale of Mount Ida, not far from the city of Troy, lived a young prince named *Paris*. He tended the flocks of his father. It was he who was chosen to decide which of the three goddesses was the most beautiful. He was one day sitting in the shadow of a tree, and playing upon a reed pipe, when suddenly the goddesses in their brilliant beauty appeared before him. They gave him the golden apple, and told him to give it to the one whom he thought most beautiful. Juno said to him, "If you will give the apple to me, I will make you a mighty king, and you shall rule over broad lands." Minerva said, "If you will give me the apple, I will give you great wisdom, so that men shall praise you as a god, and shall come from afar to ask your advice." But Venus said, "My reward to you, if you decide in my favor, shall be the most beautiful wife to be found upon the earth."

Each reward promised by the goddesses, as they spoke one by one, appeared to the prince the highest that could be desired.

But being young, he finally thought there could be nothing finer than to have the most beautiful wife on earth. Therefore, he handed the apple to Venus. This victory greatly pleased her, but the other goddesses cast their hate upon Paris and his whole race.

TREATMENT.

(*By a Normal Student.*)

Story divided into three sections, each of which is treated as a method-whole.

I. — (*A.*)

(1) **Preparation.** — Do we ever hear of more than one God? Do you think people always thought there was only one God? They used to think the sun was a god, that there was a god of thunder, of light, and gods of the sea. Have any of you ever seen a sea? Where do you suppose the gods of the sea lived? Who has ever heard or read of a cave or grotto? Do you think the people supposed the gods were anything like men and had children like men? Do you suppose the daughters of the gods worked the same as our girls now work, or as our grandmothers used to work when they were girls? How many have ever heard them tell about spinning and about the spinning-wheels, the spindles, etc., they used to use? Can you tell me what a spindle is? Do you think these girls of the gods were anything like our grandmothers, or your sisters and playmates who like to help people when they are in trouble?

(2) **Presentation.** — Story to "They were all very beautiful," etc. Repetitions and corrections.

(B.)

(3) Did you ever see a little boy or girl in danger? Coasting, skating. Did you try to help them?

FORMULATION. — *We must help our friends.*

(C.)

(4) **Application.** — What should we do when we see a little friend accidentally drop his books, or fall, or lose his ball?

II. — (A.)

(1) **Preparation.** — Where do you think the gods of the sun, the lightning, etc., lived? How many can tell whether a prince is a god or not? How many can tell me anything about a prince? Do you know what the wives of the gods were called? There were goddesses of wisdom, beauty, courage, love, discord, harmony, etc. How many can tell what is meant by discord? Do you think the people would be happy where the goddess of Discord was? When some people think they are not well treated, how do they feel? Revengeful.

(2) **Presentation.** — Story to "A strife now arose," etc. Repetition, adding first section.

(1) **Preparation.** — How many know what is meant by strife? Do you not think it would be strange to have a strife at a wedding? Bring out children's idea of reverence and of any other words they might not understand clearly.

(2) **Presentation.** — Story to "In Asia," etc. Repetition of whole so far as learned.

(B.)

(3) If some people do not treat us just as we think we ought to be treated, is it right for us to try to make them unhappy? Is it right for people to try so hard for a thing that they are unkind to each other? Can any one be happy by so doing? Was it right for these goddesses to be proud of their beauty? If they had been as good as they were beautiful, would they have been so jealous of each other? Cannot all people, even if they are not beautiful, be good?

FORMULATION. — *We should not seek revenge. Do not quarrel with your playmates. We should not be proud of our good looks. Handsome is as handsome does.*

(C.)

(4) **Application.** — If one of your little playmates should try to tease you, would it be right for you to be unkind to him in any way? Do you not feel sorry when you have had trouble with any of your playmates? How can you be happy, then? If boys and

girls have not beautiful faces, can they not be beautiful by making their lives beautiful? How can they make their lives beautiful?

III. — (A.)

(1) **Preparation.** — Where is Asia? Teacher get children's idea of a mountain and a valley, and help them locate Troy. How many have ever seen a reed? Do you think any one could make music on one? Get the children's idea of *decide*, *advice*, *victory*, etc.

(2) **Presentation.** — Finish story, uniting sections.

(B.)

(3) Did Paris do right to decide in favor of Venus simply because he wanted her present? Is it right when any one is acting as judge, to decide in favor of anything but what is right?

FORMULATION. — *We should not let our opinions be bought.*

(C.)

(4) **Application.** — If one of your playmates should say she would give you an apple if you would say she had the prettiest doll, what would you do? If mamma should ask you to do an errand for her, would it be right to say, "I will if you will give me a piece of cake"? What should you do?

§ 51. *A lesson in beginning grammar.*

WHAT ARE THE ESSENTIAL ELEMENTS OF A SENTENCE?

(A.)

(1) **Preparation.** — Why do we talk or write? To convey our thoughts to others. How is our thought expressed? In words. Are the words arranged in any particular way? Yes, in sentences. Do you know, then, what a sentence is? It is the expression of a thought in words. Can one word make a sentence? Can two? Do any sentences require at least three? The words which are necessary to make a sentence might be called its essen-

tial elements. Do you suppose the number of essential elements is the same in all sentences? Let us try to find out.

(2) **Presentation.** — How many words are there in the sentence,

Dogs are animals?

There are three. What does the word *dogs* express? The idea of a certain kind of animals. The word *animals*? The idea of a certain class of living things. What does the word *are* express? Not the idea of a *thing*, but an affirmation, or decision, of the mind with regard to dogs and animals. Could there be a thought which does not think or affirm *something of something else*? No. Could any one of the three words be omitted without destroying the present sense of this sentence? No. What is asserted of *dogs*? *What* they are.

In the sentence,

Dogs are brave,

what is asserted of *dogs*? *How* they are. *Bravery* is asserted of them.

Could any of these words be omitted? In the sentence,

Dogs are barking,

what is asserted of *dogs*? The action *barking*. What word makes the assertion? The word *are*. Could any of these words be omitted? No. How many essential elements have we found in each of the three sentences? About what has each assertion been made? *Dogs*. This word is, as you know, called what? The *subject*. What is the second or asserting word in these sentences called? It is called the *copula*. What is the third word called? It is called the *attribute*, because it shows what has been attributed to the subject.

All of these sentences have had three essential words or elements; can you give me a statement about *dogs* which shall contain but two words?

Dogs bark.

Is this an assertion? Yes. About what is the assertion made? *Dogs*. What is asserted of them? The action *bark-*

ing. What word asserts the action *barking* of dogs? (A probable pause.) The word *bark*. How many offices does the word *bark* appear to perform? Two. What are they? The office of the *copula* and also that of the *attribute*. Can you make another sentence about *dogs* which shall contain but two words? Yes.

Dogs are.

What does this mean? What have you asserted of dogs? I have asserted their *existence* (dogs exist — are existing). What word asserts this? The word *are*. How many offices does the word *are* appear to fulfill? Two; that of *copula* and that of *attribute*.

(B.)

(3) In each of the foregoing sentences we have found three elements. Can you tell what they are? (1) An *assertion* (2) *of something* (3) *about something else*. Must every sentence tell or assert something? Can you assert without asserting something? Can you assert anything without asserting it *of* something? How many elements, then, appear necessary to every sentence?

FORMULATION. — *There are three essential elements in every sentence,* SUBJECT, COPULA, *and* ATTRIBUTE; *but the copula and attribute may be blended into one word when the attribute is verbal.*

(C.)

(4) Select the essential elements in each of the sentences of your reading lesson (subject, copula, and attribute; or, if the last two are blended, subject and verb). Remember that subject and attribute may have many modifying words.

§ **52.** *A lesson in advanced grammar.*

NATURE AND USE OF THE ADJECTIVE.

(A.)

(1) **Preparation.** — Review of the noun. What did we find the proper noun to be? An *individual name*, or a name which *without limitation* will apply to one object. Illustrate: *John, Chicago.*

These names apply to their respective objects without any limitation or modification by adjectives. Is not the same thing true of common nouns? No; a common noun cannot apply to one object, or to a number of objects less than the whole class without being limited by an adjective. Illustrate: *This* apple, *two* boys, *some* trees, *good* children, *a tall* man. To what does a common noun refer when it is used without limitation? To a whole class or to the totality of that to which it refers. Illustrate: *Cats* have sharp teeth and claws, i.e., all cats; *water* is good to drink; *beauty* is pleasant to look upon. Must every noun indicate some number or quantity of that which it names? Of course. Classify objects according to number or quantity. *One, some, all.* What name have we given to that property of the noun by virtue of which it indicates a number or quantity? Its *extent*. Show in a scheme what is possible with regard to the *extent* of the noun.

Extent of the Noun, i.e., the No. or quantity of that to which the noun refers.
- (1.) One. (Individual)
- (2.) Some. (Particular.)
  - (1.) A limited No.
  - (2.) A limited quantity.
- (3.) All. (General.)
  - (1.) The whole No.
  - (2.) The whole quantity.

Is there any other idea besides number or quantity involved in the noun? Yes, quality. Show what you mean by this: An object may be thought of as composed of the qualities which inhere in it. Thus, an apple is *round, red, juicy, delicious, nutritive, smooth* or *rough, small* or *large, light* or *heavy*. Since the idea of an apple includes its qualities, the *name of that idea* also involves them. Are certain qualities found in all objects of a given class? Yes; a tree, for instance, must have *root, stem, bark, leaves, sap, wood*. Does an individual object have qualities not found in all others of its class? Yes; some roses are red, and some are white. What is a good name for the property of the noun by virtue of which it indicates what the idea of the object contains? The *content*. Show by a scheme what the content of a noun may be.

Content of the Noun, i.e., the *qualities* of the objects which the noun represents.	(1.) Qualities common to the whole class. (2.) Qualities peculiar to the individual object (as well as those common to the whole class).

(2) **Presentation.** — In the sentence,

Boys become men,

how many persons do the terms *boys* and *men* include? *All* boys and *all* men; they refer to the whole class of boys and to the whole class of men. In the sentence,

Most boys become men,

what has been done to the word *boys*? It has been limited in extent from *all boys* to *some boys*. In the sentence,

This boy will become a man,

how has the word *boy* been affected? It has been limited from the whole *class* to a single individual. In the sentence,

Water quenches fire,

how is the word *water* used? In its general or universal sense; it includes all water. Is this true in

Bring me SOME WATER?

No. A *certain quantity* is referred to, so that the word *water* is limited from its general sense, in which it includes all water, so that it embraces only a certain quantity.

(In practice, the teacher would now probably sum up what has been learned under the head of *limiting* adjectives, since this would be ample for one lesson. We will, however, complete the subject of the adjective, as if it were to be treated in a single recitation.)

Have the adjectives thus far done anything more than limit the *extent* of the noun? No. What office do the adjectives perform in the following sentences?

(1) *Good* Indians die young.
(2) *Tall* oaks from little acorns grow.
(3) The *frisky* lamb plays about its mother.
(4) The *bright* sun rises to his course.
(5) The *purring* kitten loves to lie by the fire.
(6) *Tall* boys make tall men.

They modify the noun by pointing out some quality belonging to the object represented by it. Does the adjective in any case *limit the extent* of the noun? Yes; in the first sentence the word *Indians* is limited to a part of the class. The implication is that only *bad* Indians grow up. In the sixth class, also, *tall* boys are contrasted in thought with boys who are not tall; hence, the word *boys* is limited in extent. In the second, it is not intended to restrict the term *oaks* to those which are tall, for all oaks grow from acorns. Neither is it intended to limit the word *lamb* in the third, for all lambs are frisky. In the fourth, there is no limitation in extent, for we have but one sun. So in the fifth, all kittens purr. In numbers two, three, four, and five, the adjective merely modifies the noun by pointing out a quality.

(B.)

(3) We have thus far found two kinds of adjectives. What are they? Those which simply limit the extent of the noun, and those which modify the noun by pointing out a quality. What shall we call the first? The limiting adjectives. What the second? The qualifying adjectives. What distinction did we find among the qualifying adjectives? We found that some of them restrict or limit the extent of the noun, while others simply describe without limiting. What qualifying adjectives would, in general, restrict? Those which point out qualities not common to the whole class. Which would generally not restrict? Those applying to the whole class. How, then, shall we define the adjective?

FORMULATION. — (1) *An adjective is a word that limits or modifies a noun.* (2) *A limiting adjective is one that limits the extent of a noun, without showing any quality.* (3) *A qualifying adjec-*

tive is one that modifies the noun by showing a quality, sometimes restricting the extent of the noun and sometimes not.

Show this in a scheme.

The Adjective
- (1.) *Limiting*
  - (1.) From *all* to *some* or *one*.
  - (2.) From the total to a limited quantity, or from a limited quantity to a smaller quantity.
- (2.) *Qualifying*
  - (1.) Restrictive
    - (1.) From *all* to *some* or *one*.
    - (2.) From the total to a limited quantity, or from a certain quantity to a smaller quantity.
  - (2.) Non-Restrictive, simply pointing out a quality, without limiting the extent.

(C.)

(4) **Application.** — In the following exercise, select the *limiting* and the *qualifying* adjectives. Show which of the latter are restrictive. What do you note about most of these qualifying adjectives? They are non-restrictive. Why is this? Because poetry appeals more to the imagination than to the faculty of logical exactness. How would a judge be likely to use his qualifying adjectives?

> The sun that brief December day
> Rose cheerless over hills of gray,
> And, darkly circled, gave at noon
> A sadder light than waning moon.
> Slow tracing down the thickening sky
> Its mute and ominous prophecy,
> A portent seeming less than threat,
> It sank from sight before it set.

A chill no coat, however stout,
Of homespun stuff could quite shut out,
A hard, dull bitterness of cold,
That checked, mid-vein, the circling race
Of life-blood in the sharpened face,
The coming of the snow storm told.
The wind blew east; we heard the roar
Of Ocean on his wintry shore,
And felt the strong pulse throbbing there
Beat with low rhythm our inland air.

MATHEMATICS.

§ 53. *Number lesson for the first grade.*

(This lesson is taken from Rein's "Das Erste Schuljahr," and is an example of a highly elaborated method. The children have learned a story, in the language-work, about a poor little girl whose father and mother had died; and the number of persons represented forms the starting-point of the new lesson.)

THE NUMBER THREE.

Aim. — We will find out how many persons there were in the house of the little Star Dollar Girl while her father and mother were still alive.

PART I. — ADDITION AND SUBTRACTION.

(A.)

(1) **Preparation.** — We have counted many things. How many walls has the schoolroom? How many windows? How many panes has the lower sash? The upper? Both? How many maps hang on the wall?

(2) **Presentation.** — (1) The three persons.

(*a*) There was first the father (1), then the mother (1 + 1 = 2), then their little girl (2 + 1 = 3). How many people were there? Three. Who were they? Father, mother, and child. How many are father and mother together? Two. How many are father, mother, and child? Three. Count them. Father, 1; mother, 2; child, 3; 1, 2, 3.

(b) But the three did not remain together. The father died and was buried. How many were left in the house? Now the mother died. How many were left? Finally the little girl went away; then there was no one left in the house. One away from 3 leaves 2, 1 from 2 leaves 1, 1 from 1 leaves nothing (zero); 3, 2, 1.

(2) Transition from persons to balls upon the Abacus, three balls being set off upon a horizontal wire, the following being said: That is the father, that is the mother, that is the child.

(a) Repetition of the foregoing exercise in connection with the balls:—

The father = 1 person; father and mother = 2 persons; father and mother and child = 3 persons.

Three persons — 1 person = 2 persons; two persons — 1 person = 1 person; one person — 1 person = 0 persons.

BRIEFER.

1 person, 2 persons, 3 persons; 3 persons, 2 persons, 1 person.

STILL BRIEFER.

1, 2, 3; 3, 2, 1.

(b) Repeat the given series, using ordinals:—

The father is the 1st person. The child is the 3d person.
The mother is the 2d person. The mother is the 2d person.
The child is the 3d person. The father is the 1st person.

Point to the 1st, the 3d, the 2d, the 3d, the 1st person.

(3) Represent the three members, 1, 2, 3, with sticks arranged vertically, and run through the series forwards and backwards.

(a) The father is 1 (teacher places a stick); father and mother are together 2 (teacher places a second stick alongside of the first); father, mother, and child are together 3 (teacher places another stick).

(b) That is 1 person (pointing to the 1).
These are 2 persons.
These are 3 persons.
These together are 3 persons.
These are 2 persons.
This is 1 person.

This is one.	These are three.
These are two.	These are two.
These are three.	This is one.
1, 2, 3.	3, 2, 1.

(*c*) After 1 stands 2.	Before 3 stands 2.
After 2 stands 3.	Before 2 stands 1.

(4) Arrangement of lines and numbers on the board as follows:

(*a*) Repetition of the exercise with the sticks.

(*b*) Drill with the figures 1, 2, 3.

(*c*) Draw the three lines in squares upon the slate, and place the respective figures beneath, as on the board.

(*d*) Write the figures from 1 to 3, and from 3 to 1, without the aid of the lines.

(5) Here are our three numbers again: 1, 2, 3. Change the 1 into a 3. What must you place alongside of it? Make a 3 from the 2. What must now be placed alongside of the 2? How many 3's have you now? Point to the first, the second, the third.

(*a*) From this arrangement is gained: —

$3 = 1 + 2$	$1 + 2 = 3$
$3 = 2 + 1$	$2 + 1 = 3$
$3 = 3$	$3 = 3$

Read this (teacher points to the first): —

3 is 2 + 1, etc. Point to 2 + 1, 1 + 2.

Who can say all the sentences (first from left to right, then the reverse)? Practice until this can be done perfectly.

(*b*) Let this exercise follow, pupils attentively saying: —

$3 - 1 = 2$	$3 - 3 = 0$
$3 - 2 = 1$	$3 - 2 = 1$
$3 - 3 = 0$	$3 - 1 = 2$

(*c*) *Writing the figures.* — Teacher writes the figures on the board so the children can see her. Pupils write them upon the board and upon their slates, then pointing to the figures repeat the sentences, using *and* for +, and *less* for —.

(B.)

(3) Transition to the formulation of general truth.

(*a*) Represent the three 3's with sticks, with straight marks, with points, with rings. Make a 3 with sticks from $2 + 1$, from $1 + 2$.

(*b*) Make a 3 with points, lines, rings.

(*c*) Make the other series from 1 to 3.

$1 + 1 = 2$ $3 - 1 = 2$
$2 + 1 = 3$ $2 - 1 = 1$
$1 + 2 = 3$ $1 - 1 = 0$

Read each of the sentences.

FORMULATION. — *Systematic placing together of the series learned, orally and in writing.*

(*a*) 1 2 3 3 2 1

(*b*) $3 = 1 + 2$ $3 - 1 = 2$
$3 = 2 + 1$ $3 - 2 = 1$
$3 = 3$ $3 - 3 = 0$

(*c*) $1 + 1 = 2$ $3 - 1 = 2$
$1 + 2 = 3$ $2 - 1 = 1$
$2 + 1 = 3$ $1 - 1 = 0$

(C.)

(4) **Application.** — (*a*) 1 to 3; from 3 to 1. Place sticks alongside of one another to show 1, 2, and 3.

(*b*) What number comes next after 1, after 2? what number stands before 3, before 2? What number stands between 1 and 3? Where does 1 stand? 2? 3?

(*c*) Name 3 boys, 3 girls. Which of you has 3 sisters? or 2? only 1 brother? 1 sister?

(*d*) Name the two numbers which make 3, another two; three numbers which make 3; one number which makes 3.

(*e*) How many must be added to 2 to make 3? How many must be taken from 3 that 2 may be left?

(*f*) Write the three 3's in the squares.

(*g*) There are 3 children in the room. One goes out, how many are left? Another goes out, how many still remain? Two come in again, how many are there now?

(*h*) You have given to the poor. If you had 3 cents and gave 1 to a poor man, how many would you have left? If from 3 cents you give away 2, or all 3, how many would you have?

German verse for the playground: —

Eins, zwei, drei,
Butter auf den Brei,
Salz auf den Speck,
Du musst weg. — *Simrock.*

Part II. — **Multiplication** and **Division** are developed in a similar manner.

§ 54. *Fourth grade Arithmetic lesson.*

TO MULTIPLY A FRACTION BY AN INTEGER.

(A.)

(1) **Preparation.** — How does a common fraction arise? By dividing a unit into a number of equal parts, one or more of these parts being considered as a fractional number. How is the fraction written? What does the number below the line show? The number of parts into which the unit has been divided. If the size of the unit is known, what does the denominator also show? The size of each of the equal parts. Illustrate. If one dollar is divided into ten equal parts, each part has the value of $\frac{1}{10}$ of a dollar, or ten cents. Can the *relative* size of the parts be known, even though the size of the unit is not known? Yes: $\frac{1}{2}$ is twice as large as $\frac{1}{4}$ of the same unit; $\frac{1}{3}$ is 3 times as large as $\frac{1}{9}$ of the same unit, or 5 times as large as $\frac{1}{15}$ of the same unit. What is the relation between the *size* of the parts and the *number* of parts into which the unit is divided? The larger the number of parts into which a unit is divided, the smaller their size must be. What does the numerator show? The number of parts or fractional units in the fraction. What effect does it have on the value of a fraction to increase the number of parts, or fractional units? It increases the value of the fraction: Illustrate. $\frac{4}{7}$ of a given unit is twice as great in value as $\frac{2}{7}$ of the same unit.

(2) **Presentation.** — Multiply $\frac{3}{7}$ by 2; i.e., how much are 2 3's of sevenths? Take two pieces of paper of the same size. Divide both into 7ths. Remove four sevenths from each. How much of each is left? $\frac{3}{7}$. How many 7ths are there in what remains of the two original papers? There are six 7ths. Show this by figures. $\frac{3}{7} \times 2 = \frac{6}{7}$. What appears to have been done to the numerator of the fraction? It has been multiplied by 2.

Multiply $\frac{3}{8}$ by 2. Take again two papers of equal size and fold them into 8ths. Reject $\frac{5}{8}$ of each. How many 8ths are left in each paper? $\frac{3}{8}$. How many 8ths in both pieces? There are six 8ths. Make half as many parts out of these $\frac{6}{8}$. How can you do this? By making the size of the parts twice as great; i.e., by making the parts 4ths. How many 4ths are there in $\frac{6}{8}$? There are 3. Show this by figures. $\frac{6}{8} = \frac{3}{4}$, hence $\frac{3}{8} \times 2 = \frac{3}{4}$.

(B.)

(3) Derivation of a rule.

We found that $\frac{3}{7} \times 2 = \frac{6}{7}$; i.e., that this fraction was multiplied by 2 by multiplying the numerator by 2. Suppose the multiplier had been 3? 4? 5? In any case the fraction is multiplied by multiplying the numerator, since if the number of parts, or fractional units is multiplied, the value of the fraction is multiplied.

FORMULATION. — *A fraction is multiplied by an integer by multiplying its numerator by the integer.*

We found further, that $\frac{3}{8}$ is multiplied by 2 by dividing the denominator by 2. Suppose the multiplier had been 4? Could $\frac{3}{8}$ be multiplied by 4 by dividing the denominator by 4? Yes; for the number of parts in the resulting fraction would be unchanged, but they would now be four times as large as at first. since the number of parts into which the unit is divided is only one-fourth as great as before. Make a rule.

FORMULATION. — *A fraction may be multiplied by an integer by dividing the denominator by the integer.*

Will the denominator always contain the multiplier an integral number of times? No. What must then be done? The numerator must be multiplied. Which is preferable? It is better to divide the denominator when this can be done, because the product is in lower terms than it is when the numerator is multiplied. Put these two rules together in a good way.

FORMULATION. — *To multiply a fraction by an integer, divide the denominator if it contains the multiplier as a factor, otherwise multiply the numerator.*

(C.)

(4) **Application.** — Practice upon the abstract and concrete problems given in the text-book.

READING.

§ **55**. In order not to multiply forms needlessly, the following general outline is selected from Dr. Frick, *Lehrproben und Lehrgänge*, 6 *Heft*, pp. 110–113.

TREATMENT OF A READING LESSON (POETRY OR PROSE) IN LOWER AND MIDDLE CLASSES.

(A.)

(1) **Preparation.** — (1) Announcement of purpose of lesson. (2) Introductory discussion (question and answer) designed to awaken the expectation of the pupil, and to prepare his mind for the new lesson by preparing connecting points with his experience and present knowledge.

(2) **Presentation.** — (1) Expressive reading by the teacher, who marks the chief natural subdivisions by short pauses. Get first a general view of the whole. (2) Consideration of the smaller sections. Proceed even here from the general idea of the whole situation to each smaller unity. Fix this general view by temporary development of titles which sum up briefly the chief content of each subdivision. Follow this by closer treatment of each division. For example, give brief explanations of words and thoughts; discover and clearly grasp the various elements of the selection (time, place, personalities and their increase in number, actions and their development).

(B.)

(3) **Elaboration.** — (1) In regard to content (thought): review of the articulation (number of members and their relation to one another); of the disposition and development of the whole; of the growth of mental pictures for the observation; of judgments (of æsthetical and ethical kind). Means; questions whose tendency is to concentrate the mind of the pupils upon the chief points of a thought-whole (called concentration questions). Result: a clear conception of the whole.

(2) In regard to form: Review of what is characteristic in language (distinction between poetic and prosaic, figurative and literal expression), in meter, in rhetorical figures of speech.

(C.)

(4) **Application.** — Practical exercises to gain and show an understanding and mastery of what has been attempted: (1) Reading by the pupils, careful drill (alone, with the teacher, in chorus). (2) Speaking: systematic reproduction of the various points (series building); reproduction of the headings, and, in connection, the whole disposition of the matter; reproduction of the content of the smaller section in connected narrative; free reproduction of the whole content, with especial regard to what has been added during the study of the selection. (3) Writing: written elaboration of certain definite points in the class, or as compositions for home work, after the content has been gained through the instruction, and carefully developed by the labor of all. (4) Memorizing exercises.

§ 56. *Memorizing in the lower classes.*

GENERAL PLAN.

(A.)

(1) **Preparation.** — Question and answer to awaken interest, clear up unfamiliar words and ideas.

(2) **Presentation.** — (1) Expressive reading of the whole by the teacher, that the pupils may grasp the idea of the piece as a whole. (2) Discussion of the various sections of the selection in

order, so that the pupils may get a perfect understanding of the thought. (3) *The formation of the series:* (*a*) The longer series should consist of catch-words which show the logical order of the thought, and the whole development: they may pertain to the *personalities*, to *place and time*, to *actions, etc.* (*b*) The shorter series should be those of a more mechanical nature, as *rhyme, rhythm, alliteration, regularly recurring forms, etc.*

(B.)

(3) In memorizing exercises, the main point to arrive at is the perfect, intelligent memorizing of the whole selection. Hence this is the stage at which all that has been learned should be gathered up, knit firmly together, and reproduced as a whole.

(C.)

(4) **Application, or Drill.** — Repeated repetition of the whole, and its various series, that the selection may be remembered to the last day of life. It is hardly needful to remark that nothing trivial, light, or of transitory interest is worthy of such treatment as is here indicated. What is learned in this way is to be learned forever.

§ 57. *Model Exercise.*

EXCELSIOR.

1. The shades of night were falling fast,
As through an Alpine village passed
A youth, who bore, 'mid snow and ice,
A banner with the strange device,
Excelsior!

2. His brow was sad: his eye beneath
Flashed like a falchion from its sheath,
And like a silver clarion rung
The accents of that unknown tongue,
Excelsior!

3. In happy homes he saw the light
Of household fires gleam warm and bright;
Above, the spectral glaciers shone,
And from his lips escaped a groan,
Excelsior!

4. "Try not the pass!" the old man said,
"Dark lowers the tempest overhead,
The roaring torrent is deep and wide!"
And loud that clarion voice replied,
Excelsior!

5. "O stay!" the maiden said, "and rest
Thy weary head upon this breast."
A tear stood in his bright blue eye,
But still he answered with a sigh,
Excelsior!

6. "Beware the pine-tree's withered branch!
Beware the awful avalanche!"
This was the peasant's last good-night.
A voice replied, far up the height,
Excelsior!

7. At break of day, as heavenward
The pious monks of Saint Bernard
Uttered the oft-repeated prayer,
A voice cried through the startled air,
Excelsior!

8. A traveler, by the faithful hound,
Half-buried in the snow was found,
Still grasping in his hand of ice
That banner with the strange device,
Excelsior!

9. There in the twilight cold and gray,
Lifeless, but beautiful, he lay;
And from the sky, serene and far,
A voice fell like a falling star,
Excelsior!

(A.)

(1) **Preparation.** — Introductory remarks and questions. Take your maps and turn to the map of Europe. Do you see the map of any country which is full of mountains? What are the highest mountains in Europe called? The Alps. Point them out. Do people live among them? Yes, in villages. Is the weather always bright and warm in the mountains? No: some of the mountains are always covered with snow. What are often found between the mountains where snow has melted and then frozen? Find the name in your books. Who has it? *Glaciers.* Who live on the tops of these mountains? Monks. Why? How do they find belated and storm-driven travelers? With dogs. How do people get through the mountains? Through passes. What sometimes happens here? The snow slides down the mountain-side. What is this called? The avalanche. Are these mountains very high? Might one continue to climb higher and higher for a long time? There is a Latin word which means higher. It is *Excelsior.* All pronounce it. We will now read and commit to memory a poem by Longfellow, called *Excelsior.*

(2) **Presentation.** — Teacher reads the whole poem expressively. Separate the poem into three equal parts for convenience. How does each stanza end?

First Part: — What is meant by *the shades of night*? From what does the word *Alpine* come? What did the youth carry? What is a device? Where was it written? The next stanza tells how he looked and what he did. What is a *falchion*, a silver clarion? Why unknown tongue? What kind of a word is *Excelsior*? The next stanza tells what the youth saw: (*a*) in the village; (*b*) in the mountains. Why spectral? Why did a groan come from his lips? Must he be true to the motto he carries?

What does this mean? What does the first stanza show? Where and when the youth passed with his banner. The second? How he looked and what he said. What did he say? Excelsior. What does the third stanza say? It tells what he saw in the village and on the mountain; that he groaned when he thought he must go higher. Let us read these stanzas and then repeat them. What rhymes do you notice in the first? *Fast, passed; ice, device.* In the second? *Beneath, sheath; rung, tongue.* In the third? *Light, bright; shone, groan.* In the second, what is contrasted with the sad brow? The flashing eye. In the third, what is contrasted with the firelight of the homes? The shining of the spectral glaciers. Repeat the stanzas again.

SECOND PART. — Who speaks to the youth in the fourth stanza? In the fifth? In the sixth? Of what does the old man warn him? The tempest overhead, and the roaring torrent. What did the clarion voice reply?

What did the maiden invite him to do? To stay and rest his head upon her breast. Why was there a tear in his eye? Why did he answer with a sigh? What was the peasant's warning?

> "Beware the pine-tree's withered branch,
> Beware the awful avalanche!"

How could the withered pine-tree's branch harm him? How the avalanche? What time was it now? What are the peasant's words called? The peasant's last good-night. Where was the youth? Far up the height. What did the voice reply? Excelsior. What are the rhymes in the fourth? *Said, overhead; wide, replied.* Read the stanza. Now repeat it from memory. What are the rhymes in the fifth? *Rest, breast; eye, sigh.* Read carefully. Now repeat. What are the rhymes of the sixth? *Branch, avalanche; good-night, height.* Read. Repeat from memory.

THIRD PART. — Where did the youth go when he left the village? Higher up the mountain. To whom would he come last? The pious monks of Saint Bernard. Which stanza tells of this? What does the eighth describe? How he was found by the faithful dog, with the banner still in his hand. What does the last stanza describe? How he lay, beautiful, but lifeless, in the twilight cold and gray, and how a voice fell from the sky, as if his spirit had gone still higher, and was still crying *Excelsior*. Teacher reads the seventh, and the pupils repeat after him. Note the rhymes. Repeat from memory. So of the last two stanzas.

(B.)

(3) **Grasping the whole in memory.** — What do the first three stanzas show? The youth, how he looked, what he saw. The second three? What the old man said, what the maiden said, what the peasant said. The last three? The startling of the pious monks, the finding of the traveler by the faithful hound, the lifeless but beautiful form, and the voice falling from the sky. What is the series of persons? The youth, the old man, the maiden, the peasants, the monks. Time and place? The evening, the Alpine village, the pass, the height. What reply was made to every warning or entreaty? *Excelsior*. The warnings? Tempest, torrent, the pine-tree's withered branch, the avalanche. Repeat the first section, the second, the third. Repeat the whole poem.

(C.)

(4) **Drill.** — Continue the repetitions of the sections and of the whole, until each child can give the entire poem without hesitation. When the pupil hesitates, recall or form some new association, either rational or mechanical, which will enable him to master this part. If, for instance, he hesitates in the middle of the third stanza, call attention to the contrast between the bright fires in the village and the spectral shining of the glaciers above.

GEOGRAPHY.

§ 58. *Geography founded on actual observation by the children.*

(This work is taken from Dr. Rein's "Das Dritte Schuljahr." These excursions are actually made by the pupils. It was the author's privilege to accompany the teachers of the Normal

School at Eisenach on an excursion with the children of the practice-school, and to see also the practical working out in the schoolroom of the ideas gained. There is no question as to the immense practical benefit of this kind of work. It is probable that not many American teachers will think it possible for them to spend a few hours with their schools upon excursions of this kind; but it is in the hope that some may do so, that these general directions are inserted.)

VIEW OF THE METHOD-WHOLES.

Summer Excursions.

1. The territory of the Hörsal.
2. The Wartburg and Metilstein.
3. The Werra.
4. The Forest of Thuringia.
5. The Rhön.
6. The Saale.
7. The Unstrut.
8. The land between the Forest of Thuringia and the Hartz Mountains.

EXCURSIONS.

FIRST YEAR.

1. In the fields as far as Amrichen Bridge.
2. In the woods.
3. Along the Hörsal.
4. Visit to the castle.
5. Within the city (Jacobsplan, Eichel's House, The Black Well, George Street, Half Moon, Market, Castle).
6. Upon the Goldberg, etc., making ten excursions during the first year.

SECOND YEAR.

Eleven excursions about Eisenach, in woods and valleys, along rivers and about ponds, on the hills and low mountains.

THIRD YEAR.

Fourteen excursions about the neighboring country, sometimes spending an entire day upon a longer trip.

GENERAL PLAN.

(A.)

(1) **Preparation.** — The basis for each method-whole is an excursion taken with a fixed and definite purpose. Without this excursion, the early geography is suspended in the air; without a sufficient basis in observation, the geography degenerates into the veriest verbalism. Hence the demand: *as far as possible* the geographical instruction must be based upon excursions.

Before one of these is taken, the teacher should hold a preparatory talk with the children. They must tell what they can about the way they are going to take. They will get much of it wrong, and many things they will know nothing about. The teacher will note all these points carefully, that he may be able to call their attention to that which they have poorly seen, or not observed at all. Such a preparatory talk will impel them to try to fill up the gaps in their knowledge, and to keep their eyes wide open. Seeing and observing need to be taught as well as anything else, for children, especially those of the city, are often only too blind to what nature teaches.

(2) **Presentation.** — (1) Instruction in the open air. The start is made. By means of the preparatory talk, the teacher knows to what he must call their attention, what he must show them and explain to them. He has previously measured the distance, and divided it appropriately. The children must now estimate the distances and learn them. In addition, little problems as to place and relation may be suggested, and can be drawn by the teacher upon the sand or the ground, as may be convenient. This has the advantage of showing the children how the geographical position of objects of the neighborhood may be represented upon a flat surface. They can also easily compare drawing and thing, and govern the drawing by the reality.

(2) Study in the school. (*a*) If the foundation is thus laid, the elaboration may begin in the school. It is best to take a rapid review, in order to freshen the mind regarding what has been gained. This may be done by having a pupil draw upon the board from memory; another may, in connection with this, give

an oral description. If the use of the map is understood, the journey may be reviewed there, the children pointing out the way and explaining. "Pumping" is here out of order; for what has been once brought together and fixed by the children must not be torn up by miscellaneous questioning. If the drawing is completed and briefly explained, — the teacher remains mostly passive, only interfering when a correction is needed, — the instruction upon a new lesson may be begun.

(*b*) One teacher requires the pupil systematically to describe and tell about the excursion they have taken. The child must not be interrupted in his recital, even if he makes an omission, or gets something wrong. He must be allowed to tell, in a quiet and connected manner, all that he has seen and learned upon the trip. The closer the observation was, the better will the description be. In these first general impressions there is always something lacking, something wrong. There must, therefore, be a correcting and supplementing of this general impression. There is a *need* for correcting errors now. It would be better, of course, could the child be led again directly to nature, but this could rarely be done. Besides that, the child must be taught to understand and to rely upon the map. Geographical instruction must, above all, stimulate the *creation of vivid mental pictures*, which shall come close to the reality. The teacher must in no case stop with the drilling in of names and numbers, or of maps. In the latter case we talk rightly of "paper-geography."

To awaken and to form pictures of the imagination must be considered the great purpose of geography, however difficult the task may be.

There are two means open to the teacher, of clearing up the child's first imperfect general conceptions. (1) Drawing upon the board; (2) The wall map. The first has more interest to the child, for he can see it made, help with suggestions, and it does not confuse the view by a multitude of other things. It is, however, not exact, like the printed map. Pupils must gradually be taught to use the map, though at first the board drawing is better for them. When the map can be used, it must be employed to correct and supplement the child's first general view of the topic.

Interest must be aroused by informal discussion of the various points. With a lively interest, the impression of the facts upon their minds is an easy matter.

Besides this, there are various exercises which serve to give the mind a sure hold upon the new matter. Variety is here helpful. The drill may be conducted in various ways: —

(1) The teacher points on the map according to the series, — i.e., in the order in which the ideas were learned, — and questions. Difficult names he writes upon the board.

(2) Teacher points and questions in the reverse order.

(3) A pupil points irregularly, and another answers, and the reverse.

(4) A pupil points and speaks at the same time.

(5) Recitation in chorus is often helpful in fixing points.

(*c*) Now follows the drawing of the new matter by the children, also the *isolation* of individual geographical objects, which is necessary for a close and deep observation and apprehension. The drawing is first made upon the blackboard; the others assist, correcting by word and deed. The wall map may also be at hand as a guide.

(*d*) The stage of presentation closes with a corrected and clear apprehension of the whole on the part of the children. The new matter has become clear to them. They must now be able to spare the wall map, and also the drawings on the board.

(B.)

(2) Insight. — Comparison. — Formulation.

Modern geography is based upon comparison, so that association is an important factor in this subject. Comparisons are instituted between the old and the new material of instruction. These relate to the direction, form, magnitude, etc., of the geographical objects. By means of these exercises, the notions of a system become clear. In addition, the noting of antitheses and contrasts is helpful; also, fixed series are formed, which, continually growing, finally end in a system.

In the formulation, or systematic exhibition of what has been learned, (1) The respective form images are to be drawn by the children in a geographical blank-book. In this way the pupil elaborates his own maps. In the third grade, the maps should be somewhat exact. It will assist if the board maps are drawn on a surface marked off into squares, and if the blank-books are likewise ruled. Self-made atlases are the first step to the printed maps, which the pupil should not have in hand until the upper classes are reached.

(2) Catch-words may also be written in the books to assist the memory.

(C.)

(4) **Application. — Drill.** — This stage should show that the new general truths, learned in the stage of presentation and summed up in B, are completely mastered, in themselves and in relation to what was formerly learned. The following exercises will prove helpful here: —

(1) Drawing of the sketch from memory, eventually in connection with what has been learned before. The geographical forms must have become so fixed in the pupil's mind that he is able to represent them by lines. Drawing is therefore the "Writing of geographical thoughts." (Delitsch.)

(2) Imaginary journeys.

(3) Profile drawings.

(4) It is an excellent means to work out the given geographical tract in sand, or in clay.

(5) Explanation of pictures by the children (*Münchener und Stuttgarter Bilderbogen; Bräunlich und Schmidt, Aus aller Herrn Länder, Leipzig; Geographische Characterbilder von Hölzel in Wien; Geographische Bildertafel von Hirt in Breslau; die Lehmannschen Bilder; die landschaftlichen Characterbilder von Kirchhoff und Supau, Kassel; etc.*).

(6) Reading of descriptions in reading-books; the writing of descriptions.

HISTORY.

§ 59. *Course of an oral history lesson in middle and lower classes.* (Dr. Frick, *Lehrproben und Lehrgänge, Heft* 6, p. 106.)

(A.)

(1) **Preparation.** — First observation (inner) and apprehension.

(*a*) Connection with former lessons by means of questions which, reaching back, gather up those points which will serve as transition to, and preparation for, the new lesson.

(*b*) Announcement of the purpose of the lesson.

(*c*) Introductory remarks. These remarks take their rise from the pupil's world of experience. Suppose, for instance, the pupils know the story of the Argonautic expedition, and now come to the journey of Columbus. It is evident that to call the former to mind will increase the interest in the latter. The effort must always be to bridge the gulf which separates the distant deed and its foreign world from the present and the experience of the pupil.

(2) **Presentation.** — Concrete, vivid narration by the teacher, of the elements of historical life, the stages of the action, and what is characteristic in them. These things must be brought clearly to view in separate subdivisions (method-wholes), that there may be a clear apprehension of the lesson as a whole. For this purpose it is well, at the close of each section for the teacher, assisted by the pupils, to sum up the chief contents of the section in condensed headings, which are to be drilled upon both now and afterwards. It will be well to have the pupils record these in their note-books.

(B.)

(3) **For gaining a deeper insight.** — (*a*) Placing together of all the written headings, as well as the teacher's whole plan of the lesson, as a guide to the impression upon the mind of all that is to be held.

(*b*) Fuller apprehension of the individual facts by *comparing, uniting, and grouping* the various elements of the given narration.

(*c*) Bringing out of the main points by concentration questions. An example from the seventh grade — Greater method-whole — The Trojan War. Separation into smaller unities: (1) The inner cause, outer occasion, participants in the war, departure and landing. (2) The battles about Troy. (3) The capture and destruction of the city. Consequences. Suppose the story of the battles has been given. We should ask at the close of the narration concerning the following points: (1) The seat of war (kingdom and city of Priam; plain of Scamander, picture of the city); (2) Actors. Since the Achaian leaders are known from the first section, we have now to do with the increase to the Trojan side, Priam and his house. Parallels: Priam and Agamemnon. (Difference: Priam the ruler of a large empire, and the patriarchal head of a royal family; Agamemnon the military leader of numerous tribes). Hector and Achilles, Menelaus and Paris, Helen and Chalcas, etc. (3) Actions. Pictures of the war. General engagements and duels. Groups of the latter (Battle of Paris and Menelaus, Ajax and Hector, Achilles and Hector). Pictures of cessation from war: Councils (quarrel of Agamemnon and Achilles). Ambassadors. Parting of Hector and Andromache, etc. Special increase of new and unknown elements of historical life, of ethical character (lamentable fate of Hector), etc.

(C.)

(4) **Practice. — Drill. — Application.** — Connected recitation of individual points (series formation). Repetition of the condensed headings in connection. Recitation of smaller sections in full and connected form, — all to show an understanding of the whole, which is now deepened and made clear.

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